Tangyes Limited

GENERAL CATALOGUE

POCKET EDITION, 1884

CORNWALL WORKS, BIRMINGHAM

LONDON: TANGYE BROTHERS, 35 Queen Victoria Street
NEWCASTLE: " St. Nicholas Buildings
MANCHESTER: " St. Mary's Gate
GLASGOW: " Argyle Street
SYDNEY: " 119 Bathurst Street
MELBOURNE: " Collins Street

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Wm Digby.

Ealing.

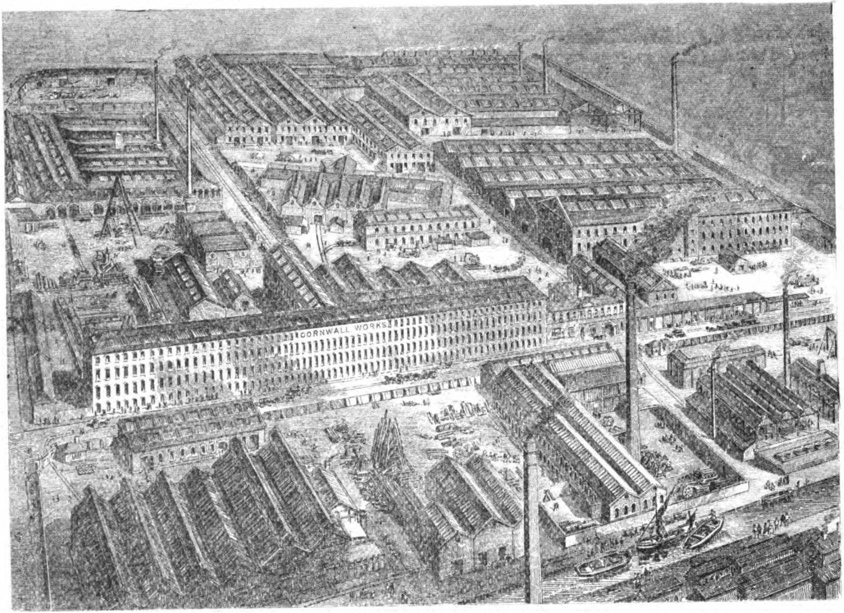
Oct. 10, 1854.

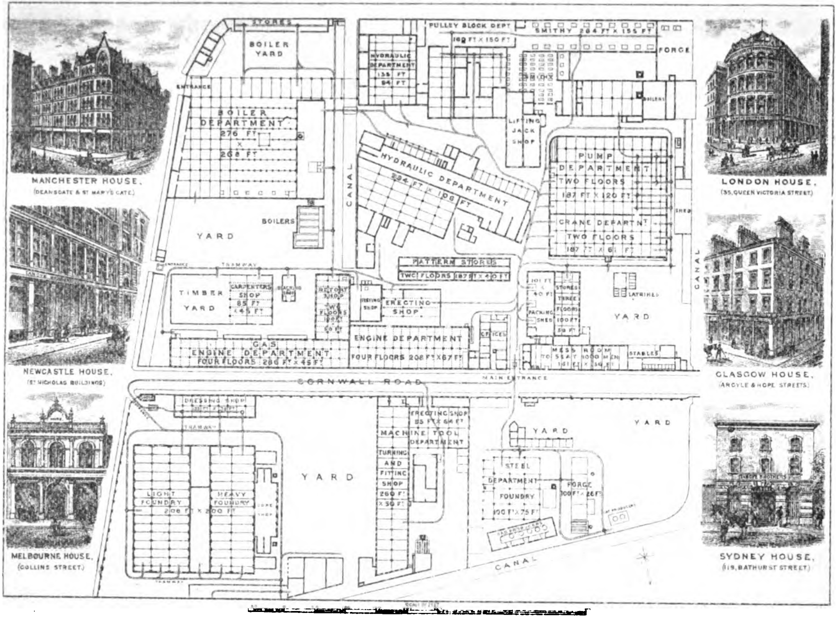
Wm P Digby

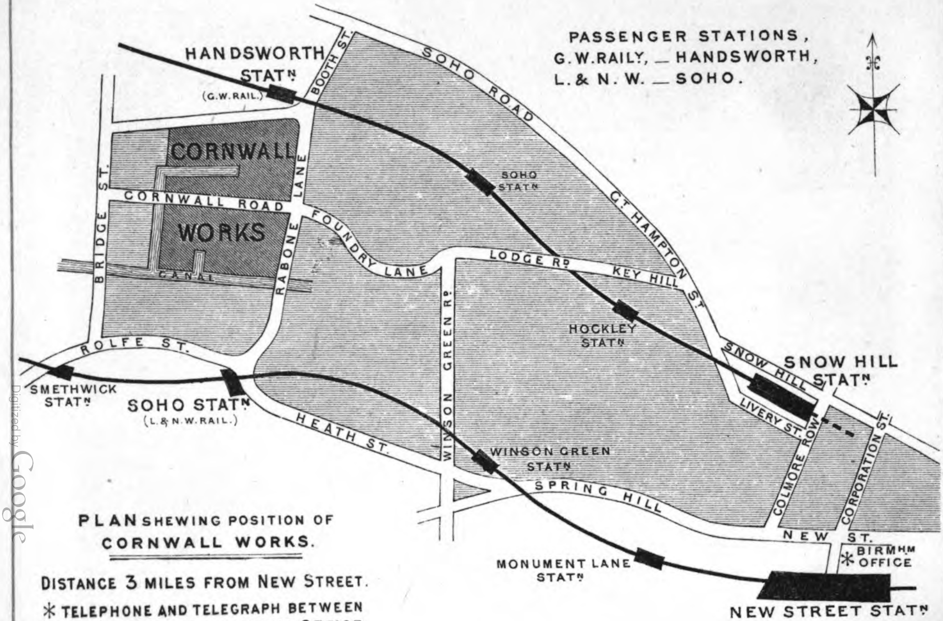
Mar 2 1896

Bromley

JC


CORNWALL WORKS


MANCHESTER HOUSE,
(DEANSGATE & ST MARY'S GATE.)
NEWCASTLE HOUSE,
(ST NICHOLAS BUILDINGS)
MELBOURNE HOUSE,
(COLLINS STREET.)
LONDON HOUSE,
(35, QUEEN VICTORIA STREET)
GLASGOW HOUSE,
(ARGYLE & HOPE STREETS)
SYDNEY HOUSE,
(19, BATHURST STREET)
STORES
BOILER YARD
ENTRANCE
BOILER DEPARTMENT 276 FT × 268 FT
BOILERS
YARD
CANAL
HYDRAULIC DEPARTMENT 135 FT 84 FT
PULLEY BLOCK DEPT 160 FT × 150 FT
SMITHY 284 FT × 155 FT
FORGE
BOILERS
LIFTING JACK SHOP
HYDRAULIC DEPARTMENT 284 FT × 106 FT
PUMP DEPARTMENT TWO FLOORS 187 FT × 120 FT
CRANE DEPARTMNT TWO FLOORS 187 FT × 61 FT
SHED
CANAL
PATTERN STORES TWO FLOORS 187 FT × 40 FT
ENTRANCE
TRAMWAY
TIMBER YARD
CARPENTERS SHOP 85 FT × 45 FT
RETORT SHOP
TWO FLOORS 100 FT × 50 FT
TESTING SHOP
ERECTING SHOP
GAS ENGINE DEPARTMENT FOUR FLOORS 286 FT × 45 FT
ENGINE DEPARTMENT FOUR FLOORS 208 FT × 67 FT
OFFICES
101 FT × 40 FT
PACKING SHED
STORES THREE FLOORS 100 FT × 59 FT
LATRINES
YARD
MESS ROOM TO SEAT 1000 MEN 161 FT × 56 FT
STABLES
MAIN ENTRANCE
CORNWALL ROAD
DRESSING SHOP
TRAMWAY
LIGHT FOUNDRY
HEAVY FOUNDRY
208 FT × 200 FT
CORE SHOP
TRAMWAY
YARD
ERECTING SHOP 85 FT × 64 FT
MACHINE TOOL DEPARTMENT
TURNING AND FITTING SHOP 260 FT × 50 FT
YARD
YARD
STEEL DEPARTMENT
FOUNDRY 100 FT × 75 FT
FORGE 100 FT × 26 FT
GAS PRODUCERS
CANAL
SCALE OF FEET



PLAN SHEWING POSITION OF
CORNWALL WORKS.

DISTANCE 3 MILES FROM NEW STREET.

* TELEPHONE AND TELEGRAPH BETWEEN
WORKS AND BIRMINGHAM OFFICE.

Tangyes Limited

GENERAL CATALOGUE

POCKET EDITION, 1884

TRADE MARK

TANGYES, BIRMINGHAM

CORNWALL WORKS, BIRMINGHAM

◆

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JOHN BELLOWS, GLOUCESTER 125151

NOTE

All previous Lists are hereby cancelled, and the prices given in this Catalogue are subject to alterations, of which we cannot undertake to give notice.

The Illustrations are given merely as a general guide to purchasers, and are not binding as to detail. Where an article is made in more than one size, it occasionally happens that the different sizes vary in design.

The weights, measurements, powers and quantities, given in the tables, must be *taken as approximate.*

Terms.—Prompt Cash, for which, in general, a discount is allowed. Special arrangements in the case of Orders for large amounts.

Foreign Orders should be accompanied by remittances, or references to some established mercantile house in England for payment on presentation of Invoices.

Prices do not include packing or delivery. Two-thirds the invoiced price of packing cases is allowed when returned *in good condition* carriage free, and advised.

In ordering, please refer to **1884 EDITION.**

July 1st, 1884,
Cornwall Works
Birmingham.

JOHN JOHNSON
Bibl. Bodl.

SYNOPSIS

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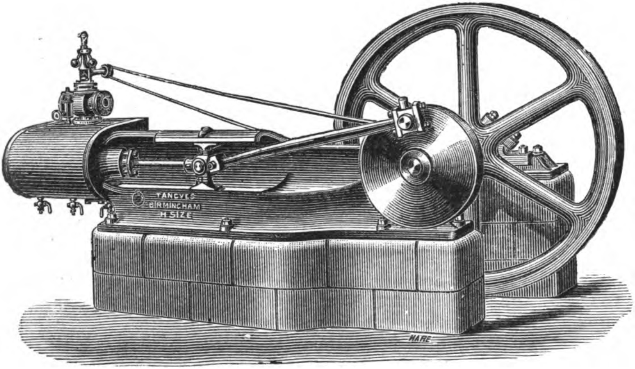
TANGYES' HORIZONTAL STEAM ENGINE

With Patent Governor.



In this Engine the bed-plate, front cylinder cover, cross-head guides, and plummer-block for crank shaft bearing, are cast in one, the cylinder with its valve chest being bolted to the end of the bed. The cross-head slippers and connecting-rod ends are made adjustable, so that any wear can be readily taken up. The fly-wheel face, cylinder end, connecting-rod, and crank plate are bright.

All parts to Whitworth's Gauge; duplicates can be obtained by giving number of Engine.

The speed of the Engine can be increased or reduced by simply tightening or releasing the cap which forms the top of the Governor.

For economy we recommend Condensers pages 36 *and* 37, *but where neither design can be adopted the Exhaust Steam should be utilized for heating the feed water.*

Feed Water Heater, see page 38.

This Engine is made both right hand (as shown) and left: when required left hand, state on order "REVERSE TO LIST."

TANGYES' HORIZONTAL STEAM ENGINE

Size		B	C	D	E	G	H
Nominal Horse Power		2	3	4	6	8	10
Diam. Steam Cylinder	ins.	4	5	6	8	9	10
Length Stroke	"	8	10	12	16	18	20
Revolutions per Minute	...	180	144	120	100	90	85
Price of Engine	£	25	34	40	63	80	104
Feed Pump	extra...£	3	3 10	4	5	6	7
Variable Expansion Gear	" ...£	...	...	...	...	13	14
Holding-down Bolts and Plates	" ...£	1 5	1 15	2	3	4 10	5
Diam. Fly-wheel	ins.	30	39	48	54	60	66
Width Face, turned	"	3	4	5	6	7	8
Diam. Fly-wheel Shaft	"	2	2⅜	2¾	3¼	3⅝	4
Length " "	"	28	36	39	45	48	51
Diam. Steam Inlet	"	¾	1	1¼	1½	1¾	2
" Exhaust Outlet	"	1¼	1½	1¾	2¼	2½	3
" Suc. & Dely. Feed Pump	"	½	¾	1	1¼	1¼	1½
Weight Engine	cwts.	4½	7	9½	17	27½	35½
" Fly-wheel	"	1¾	3¾	6¼	9½	13	16

Size			I	J	Jᴬ	K	M
Nominal Horse Power		...	12	14	16	20	25
Diam Steam Cylinder	ins.	...	11¼	12	13	14¼	16
Length Stroke	"	...	20	24	24	28	28
Revolutions per Minute	...	...	85	75	75	65	65
Price of Engine	£	...	115	125	145	175	200
Feed Pump	extra...£	...	7	8	8	10	15
Variable Expansion Gear	" ...£	...	14	15	16	20	25
Holding-down Bolts and Plates	" ...£	...	6	6	6	7 10	8
Diam. Fly-wheel	ins.	...	66	72	72	90	108
Width Face turned	"	...	8	9	9	10	12
Diam. Fly-wheel Shaft	"	...	4¼	4½	4½	4⅞	5⅜
Length " "	"	...	54	54	54	63	72
Diam. Steam Inlet	"	..	2½	2½	3	3½	4
" Exhaust Outlet	"	...	3½	3½	4	4½	5
" Suc. and Dely. Feed Pump	"	...	1½	1½	1½	1¾	1¾
Weight Engine	cwts.	...	36	48	50	68	74
" Fly-wheel	"	...	16	22	23	30	40

A Sole Plate for Back Chair is included in price.
The Feed Pump has Gun Metal working parts.
The H. I, J, Jᴬ, K, and M sizes have Steam Jacketted Cylinders.

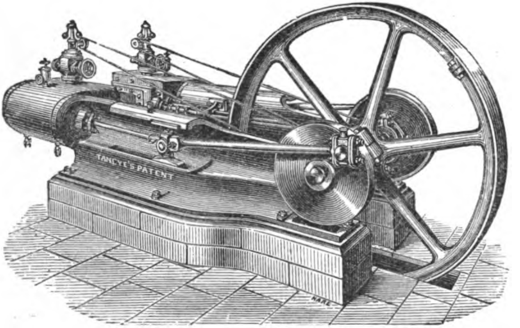
For Cornish Boilers suitable for these Engines, see page 43.
For Engines with Steam Jacketted Cylinders we recommend Steam Trap for removing Condensed Steam, see page 39.

TANGYES'

HORIZONTAL STEAM ENGINE

COUPLED

With Patent Governor.



These Engines are precisely the same in design as the foregoing, and being made right and left hand, can be coupled for many purposes with great advantage, forming a very handsome and compact arrangement. They are now supplied with one large Governor between the pair, together with Stop Valve to each Engine, but separate Governors, as illustrated, can be supplied, at an extra price, if ordered. The Fly-wheel is in halves, and fitted with turned Bolts.

Size	**B**	**C**	**D**	**E**	**G**	**H**	**I**	**J**	**J^A**	**K**	**M**
Nominal Horse Power ...	**4**	**6**	**8**	**12**	**16**	**20**	**24**	**28**	**32**	**40**	**50**
Diam. Steam Cyls. ... ins.	**4**	**5**	**6**	**8**	**9**	**10**	**11¼**	**12**	**13**	**14¼**	**16**
Length Stroke ... ... "	**8**	**10**	**12**	**16**	**18**	**20**	**20**	**24**	**24**	**28**	**28**
Revolutions per Min. ...	**180**	**144**	**120**	**100**	**90**	**85**	**85**	**75**	**75**	**65**	**65**
Price per Pair ... ... £	**50**	**68**	**80**	**126**	**160**	**208**	**230**	**250**	**290**	**350**	**400**
Feed Pumps " ... extra £	6	7	8	10	12	14	14	16	16	20	30
Variable Expan. Gear " £	...	...	...	...	26	28	28	30	32	40	50
Holding dwn. Blts. & Plts. £	2	2 15	3 5	4 15	7 5	8	10	10	10	13	14
Diam. Fly-wheel ... ... ins.	30	39	54	60	66	78	78	84	84	96	120
Width Face, turned ... "	3½	5	6	7	9	12	15	18	18	20	24
Diam. Steam Inlet ... "	1¼	1½	1¾	2	2½	3	3½	3½	4	5	5½
" Steam Outlets (two) "	1¼	1½	1¾	2¼	2½	3	3½	3½	4	4½	5

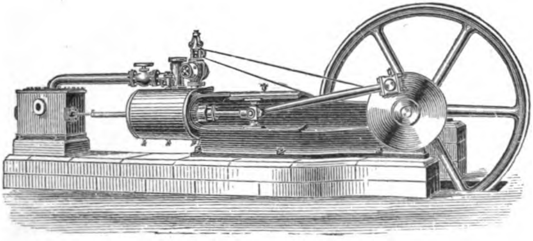
The H, I, J, J^A, K and M sizes have Steam Jacketted Cylinders.

For Engines with Steam Jacketted Cylinders we recommend Steam Trap, for removing Condensed Steam, see page 39.

TANGYES' HORIZONTAL

CONDENSING STEAM ENGINE

With Patent Governor.



The illustration shows the "Tangye" Steam Engine, page 4, combined with Horizontal Air Pump Condenser, page 36. The Condenser is fitted with a Three-way Valve, to allow exhaust steam to be easily diverted into atmosphere, and for facilitating starting.

The speed of the Engine can be increased or reduced by simply tightening or releasing the cap which forms the top of the Governor.

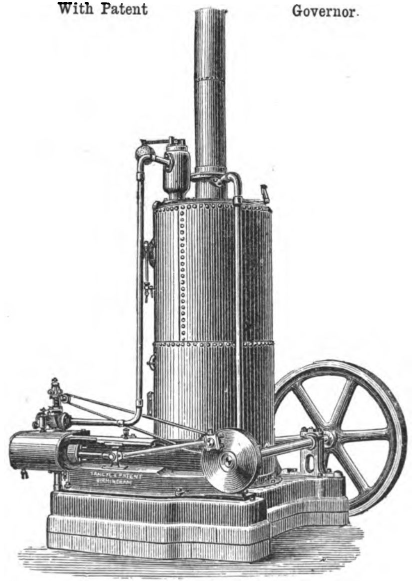
Size	D	E	G	H	I	J	J^A	K	M
Nominal Horse Power	4	6	8	10	12	14	16	20	25
Diam. Steam Cylinder ... ins.	6	8	9	10	11¼	12	13	14¼	16
Length Stroke ... ... "	12	16	18	20	20	24	24	28	28
Revolutions per Minute	120	100	90	85	85	75	75	65	65
Price of Engine with Condenser and connections } £	73	102	123	150	163	180	206	244	276
Variable Expansion Gear extra £	...	...	13	14	14	15	16	20	25
Holding-down Bolts & Plates " £	2 10	3 10	5 10	6	7	8	8	9	10
Diam. Fly-wheel ... ... ins.	48	54	60	66	66	72	72	90	108
Width Face, turned.. ... ... "	5	6	7	8	8	9	9	10	12
Diam. Steam Inlet ... . "	1¼	1½	1¾	2	2½	2½	3	3½	4
" Exhaust Outlet ... ... "	1¾	2¼	2½	3	3½	3½	4	4½	5

The H, I J, J^A, K and M sizes have Steam Jacketted Cylinders.
Feed Pump, extra.

TANGYES' HORIZONTAL STEAM ENGINE

AND VERTICAL BOILER.

With Patent Governor.



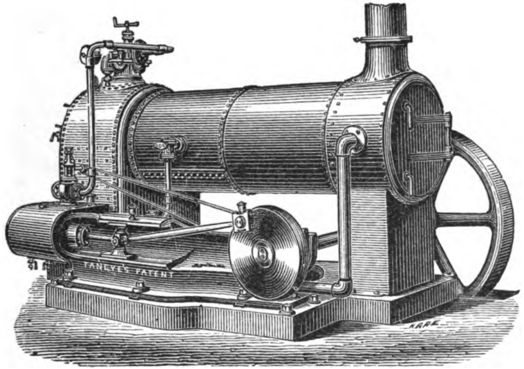
Size	**B**	**C**	**D**	**E**	**G**	**H**	**I**	**J**
Nominal Horse-Power ...	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**14**
Diam. Steam Cyl. ... ins.	**4**	**5**	**6**	**8**	**9**	**10**	**11¼**	**12**
Length Stroke ... "	**8**	**10**	**12**	**16**	**18**	**20**	**20**	**24**
Revolutions per Min. ...	**180**	**144**	**120**	**100**	**90**	**85**	**85**	**75**
Engine and Boiler on Base with Feed Pump } £	**63**	**80**	**98**	**130**	**170**	**215**	**238**	**270**
Diam. Fly-wheel ... ins.	30	39	48	54	60	66	66	72
Width Face, turned ... "	3	4	5	6	7	8	8	9
Weight ... ... cwts.	21	30	43	62	87	113	125	154

For Vertical Boiler, see page 40.

TANGYES' HORIZONTAL STEAM ENGINE

AND MULTITUBULAR BOILER.

With Patent Governor.



This illustration shows a combination of the "Tangye" Steam Engine, page 4, and Multitubular Boiler, page 44, mounted on a strong cast iron base.

Feed Pump included in price.

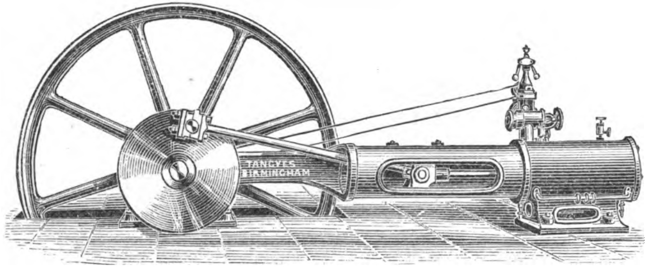
Size	D	E	G	H	I	J
Nominal Horse-power of Engine	4	6	8	10	12	14
" " Boiler	6	8	10	12	14	16
Diam. Steam Cylinder ... ins.	6	8	9	10	11¼	12
Length Stroke ... ... "	12	16	18	20	20	24
Revolutions per Minute ...	120	100	90	85	85	75
Price ... ... £	132	170	204	240	275	314
Variable Expansion Gear extra £	...	...	13	14	14	15
Link Motion Reversing Gear " £	20	20	20	22	22	23
Diam. Fly-wheel ... ... ins.	48	54	60	66	66	72
Width Face, turned ... ... "	5	6	7	8	8	9
Weight ... ...cwts.	70	90	120	150	170	195

The H, I, and J sizes have Steam Jacketted Cylinders.

TANGYES'

HIGH-PRESSURE STEAM ENGINE

With Patent Governor.



In this Engine the piston rod, valve spindle and crank shaft are of steel, the bearings extra large, and so arranged that any wear can be readily taken up. The main bearings, of gun-metal, are in three pieces, and are fitted with wedge adjustment. The expansion valves are so arranged that they can be adjusted to any required grade of expansion whilst the Engine is in motion: the cylinder is steam jacketted, lagged with sheet steel, and fitted with relief valves, condensed steam cocks, lubricators, and grease cups. The Fly-wheel is in halves, and fitted with turned Bolts.

The speed of the Engine can be increased or reduced by simply tightening or releasing the cap which forms the top of the Governor.

Nominal Horse Power	**30**	**40**	**50**	**60**
Diam. Steam Cylinder ... ... ins.	**18**	**20**	**22¼**	**24½**
Length Stroke ... ... ''	**36**	**40**	**40**	**48**
Revolutions per Minute	**60**	**53**	**53**	**44**
Price Engine with Varble. Expn. Gear £	**275**	**350**	**400**	**480**
Holding Down Bolts and Plates ... extra £	14	15	16	17
Diam. Fly-wheel ... ... ins.	132	144	168	180
Width Face, turned ... ... ''	12	22	24	26
Diam. Fly-wheel Shaft ... ... ''	6¾	7½	7¾	8½
Length '' '' ... ... ''	81	87	93	102
Diam. Steam Inlet ... ... ''	4½	5	5½	6
'' Exhaust Outlet ... ... ''	6	7	8	9
Weight Engine and Fly-wheel ... tons	9	13	14½	21½
'' Fly-wheel only ... ... ''	2¾	5	6	8

Feed Pump, extra

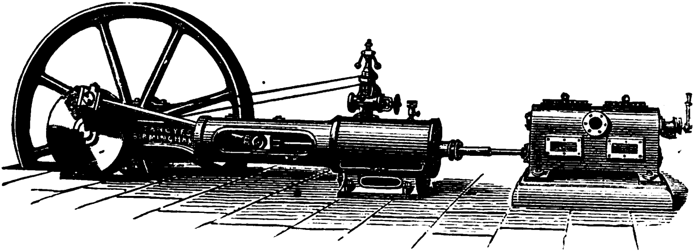
These Engines can be conveniently coupled. Prices on application.

For Steam Trap, see page 39.

TANGYES' HIGH-PRESSURE

CONDENSING STEAM ENGINE

With Patent Governor.



This Engine is that described on preceding page, with Horizontal Air Pump Condenser attached.

The Air Pump is double acting, and so arranged with the Condenser that the piston always works in water free from air spaces for vapour to expand in.

For description of Condenser see page 36.

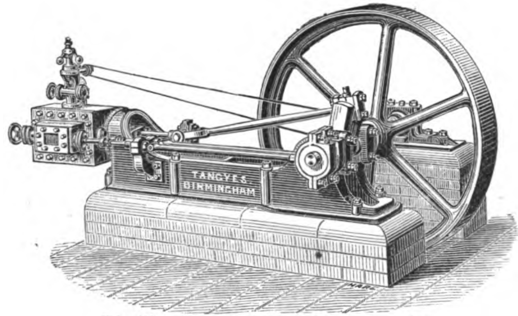
Nominal Horse Power	30	40	50	60
Diam. Steam Cylinder ... ... ins.	18	20	22¼	24½
Length Stroke ... ... "	36	40	40	48
Revolutions per Minute	60	53	53	44
Price Engine and Condenser... £	355	450	505	605
Holding Down Bolts and Plates extra £	18	20	21	23
Diam. Fly-wheel ... ... ins.	132	144	168	180
Width Face, turned ... ... "	12	22	24	26
Diam. Fly-wheel Shaft ... ... "	6¾	7½	7¾	8½
Length " " ... ... "	81	87	93	102
" Steam Inlet ... ... "	4½	5	5½	6
" Exhaust ... ... "	6	7	8	9

Feed Pump not included.

These Engines can be conveniently coupled. Prices on application.

TANGYES' "BELFAST" STEAM ENGINE

With Patent Governor.



The illustration represents the 12 × 24 *size.*

The Engine is self-contained on strong bed plate, has wrought-iron bow crank shaft machined all over and working in long gun-metal bearings; steel cross head, piston rod, and valve spindles, wrought-iron connecting rod and gun-metal adjustable bearings, cylinder steam jacketted, and lagged with sheet steel.

Expansion gear on Meyer's system with hand wheel at back of cylinder, for varying grade of expansion while Engine is running.

Tangyes' patent Governor with equilibrium eccentric throttle and stop valve.

Nominal Horse Power...	**10**	**14**	**16**
Diam. Steam Cylinder ... ... ins.	**10**	**12**	**13**
Length Stroke... ... ... "	**18**	**24**	**24**
Revolutions per Minute	**130**	**125**	**125**
Price of Engine ... ... £	**120**	**142**	**155**
Variable Expansion Gear ... extra...£	18	19	19
Holding-down Bolts and Plates " ...£	4	6	6
Diam. Fly-wheel ... ... ins.	66	72	84
Width Face, turned ... ... "	8	9	9
Diam. Steam Inlet ... ... "	2	2½	3
" Exhaust Outlet ... ... "	3	3½	4
Weight Engine and Fly-wheel... cwts.	50	72	75
" Fly-wheel only ... ... "	16	22	24

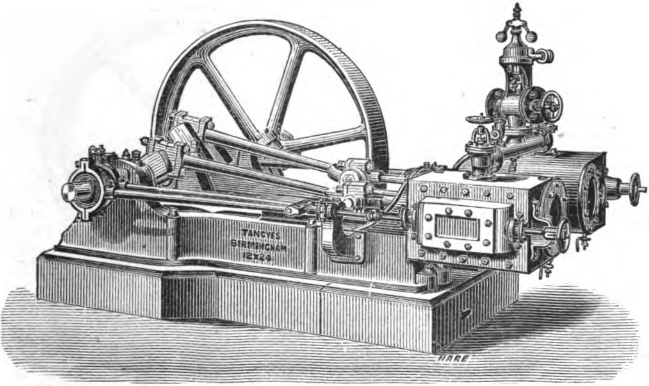
Feed Pump, not included

For Steam Trap, see page 39.

TANGYES' "BELFAST" STEAM ENGINE

COUPLED.

With Patent Governor.



The illustration represents a pair of the Engines described on previous page.

In the Coupled Engines the Crank Shaft works in three long gun-metal bearings, each bearing being in three parts, with wedge adjustment.

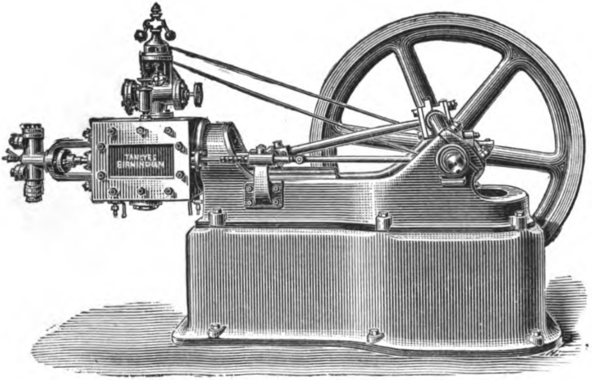
Nominal Horse Power	**20**	**28**	**32**
Diam. Steam Cylinders... ... . ins.	**10**	**12**	**13**
Length Stroke ... ... „	**18**	**24**	**24**
Revolutions per Minute	**130**	**125**	**125**
Price of pair Engines .. .. £	**240**	**284**	**310**
Variable Expansion Gear ... . extra £	36	38	38
Holding Down Bolts and Plates	8	12	12
Diam. Fly-wheel, in halves ... ... ins.	66	84	90
Width Face, turned ... ... „	8	9	10
Diam. Steam Inlet ... ... „	3	3½	4
„ Exhaust Outlets (two) ... ... „	3	3½	4
Weight Engine and Fly-wheel .. ... cwts.	98	140	150
„ Fly-wheel only ... ... „	16	24	30

Feed Pump, not included.

For Steam Trap, see page 39.
N.B. For these Engines arranged to work vertically, see page 25.

TANGYES' "COLONIAL" STEAM ENGINE

With Patent Governor.



The speed of the Engine can be increased or reduced by simply tightening or releasing the cap which forms the top of the Governor.

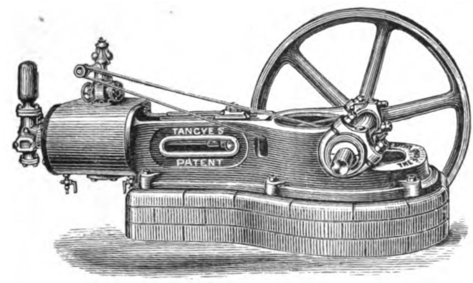
The Fly-wheel can be put on either end of Fly-wheel Shaft.

Nominal Horse Power...		**4**	
Diam. Steam Cylinder ... ins.		**6**	
Length Stroke ... ... "		**12**	
Revolutions per Minute		**150**	
Price of Engine ... ... £		**37**	
Feed Pump ... ... extra		65/-	
Holding-down Bolts and Plates ... "		20/-	
Diam. Fly-wheel ... ... ins.		48	
Width Face, turned ... ... "		5	
Diam. Fly-wheel Shaft ... ... "		2½	
Length " " ... ... "		41½	
Diam. Steam Inlet ... ... "		1½	
" Exhaust Outlet ... ... "		2	
Weight Engine and Fly-wheel ... cwts.		16	
" Fly-wheel only ... ... "		6	

Cast-iron Base shown in illustration, extra.
Other sizes in preparation.

TANGYES' "SOHO" STEAM ENGINE

With Patent Governor.



The speed of the Engine can be increased or reduced by simply tightening or releasing the cap which forms the top of the Governor.

The Fly-wheel can be put on either end of Fly-wheel Shaft.

Nominal Horse Power ...	3	4	6	8	10	12	14
Diam. Steam Cylinder ins.	5	6½	8	9	10	11¼	12
Revs. per Min.	240	192	180	180	150	150	130
Price of Engine ... £	25	33	42	52	66	83	95
Feed Pump ... ... extra	40/-	50/-	60/-	60/-	80/-	80/-	100/-
Holding Dn. Blts. & Plts. "	15/-	20/-	25/-	25/-	40/-	40/-	50/-
Diam. Fly-wheel ... ins.	30	35	40	40	50	54	60
Width Face, turned ... "	4	5	6	6	8	9	10
Length Fly-wheel Shaft outside bearings ... "	5	6½	8	8	10	10	12
Diam. Fly-wheel Shaft "	2	2⅜	2¾	2¾	3⅜	3⅜	4
" Steam Inlet ... "	1¼	1½	2	2	2½	2½	3
" Exhaust Outlet "	1½	2	2½	2½	3	3	3½
" Suction & Deliv'y. of Feed Pump "	1	1	1	1	1	1	1¼
Ground Space occupied "	60×30	69×37	83×43	83×43	101×54	101×54	121×63
Wt. Engine & Fly-wheel cwts.	4¾	7½	12½	12½	20	23	31

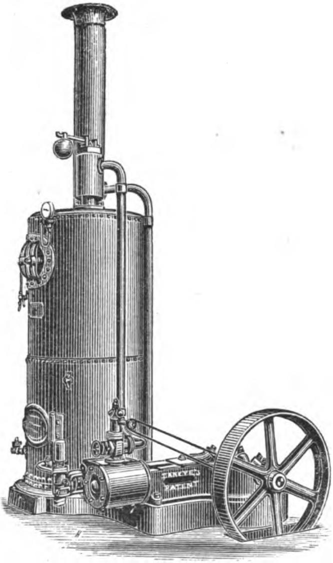
Note.—With each Engine is supplied a Zinc Foundation Template and Oil Catcher.

For Cornish Boilers suitable for these Engines, see page 43.

TANGYES' "SOHO" STEAM ENGINE

WITH VERTICAL BOILER,

And Patent Governor.



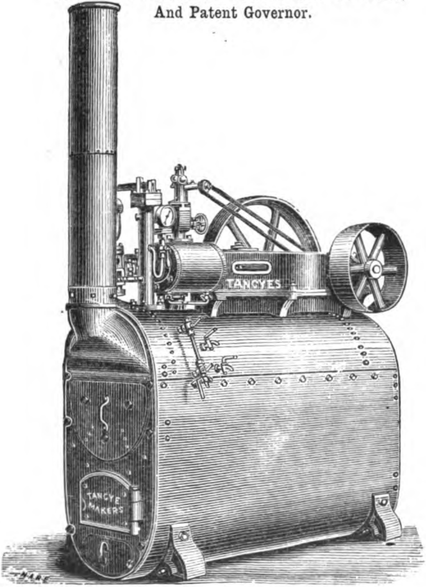
Nominal Horse Power ...	3	4	6	8	10	12	14
Diam. Steam Cyl. ... ins.	5	6½	8	9	10	11¼	12
Revolutions per Minute	240	192	180	180	150	150	130
Engine and Boiler on Base with Feed Pump £	68	86	105	138	172	200	235
Diam. Fly-wheel ... ins.	30	35	40	40	50	54	60
Width Face, turned ... "	4	5	6	6	8	9	10
Weight ... cwts.	24	32	44	70	80	95	110

For Vertical Boiler, see page 40.

TANGYES' "SOHO" STEAM ENGINE

WITH "COLONIAL" TUBULAR BOILER,

And Patent Governor.



Nominal H.P. of Engine ...	3	4	6	8	10	12	14
" " Boiler ...	4	6	8	10	12	12	14
Diam. Steam Cylinder ins.	5	6½	8	9	10	11¼	12
Revolutions per Minute ...	240	192	180	180	150	150	130
Engine and Boiler with Feed Pump ... ... £	76	90	118	163	193	210	242
Diam. Fly-wheel... ... ins.	30	35	40	40	50	54	60
Width Face, turned ... "	4	5	6	6	8	9	10
Length and Width of Boiler "	60x24	66x27	90x30	132x33	144x36	144x36	156x39
Heating surface of Boiler ft.	48	66	114	200	240	240	280

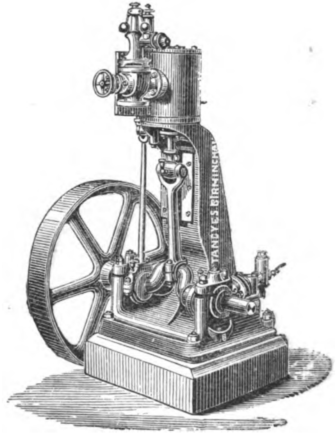
Pulley on Fly-wheel Shaft, extra.

For "Colonial" Tubular Boiler see page 41.

TANGYES' VERTICAL STEAM ENGINE

SINGLE STANDARD.

With Patent Governor



The Fly-wheel can be put on either end of Fly-wheel Shaft.

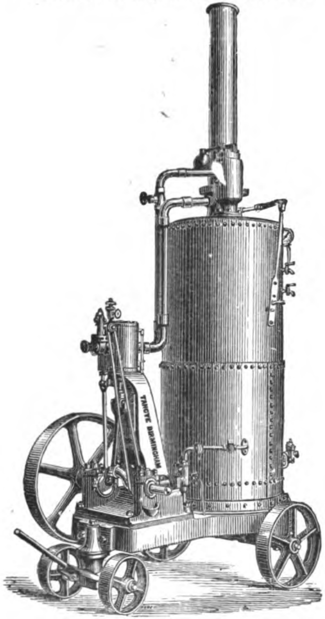
Nominal Horse Power	2	3
Diam. Steam Cylinder... ... ... ins.	4	5
Revolutions per Minute	240	240
Price of Engine ... ... £	20	27
Feed Pump ... ... extra	40/-	40/-
Holding-down Bolts and Plates "	10/-	10/-
Diam. Fly-wheel... .. .. ins.	25	30
Width Face, turned ... ... "	3½	4
Diam. Steam Inlet ... ... "	1	1¼
" Exhaust Outlet ... ... "	1¼	1½
Weight Engine and Fly-wheel ... cwts.	4	6¼

TANGYES' VERTICAL STEAM ENGINE

SINGLE STANDARD

WITH VERTICAL BOILER ON WHEELS,

Feed Water Tank, and Patent Governor.

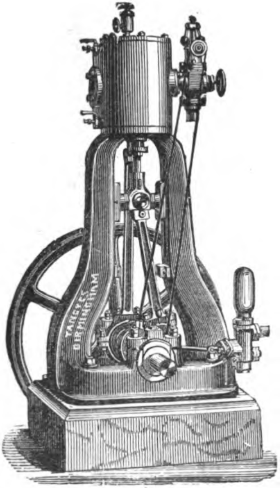


Nominal Horse Power	2	3
Diam. Steam Cylinder ... ... ins.	4	5
Revolutions per Minute	240	240
Engine and Boiler on Wheels ... £	63	79
" " without Wheels £	56	70
Diam. Fly-wheel... ... ... ins.	25	30
Width Face, turned .. .. "	3½	4
Weight ... ... cwts.	20	29

TANGYES' VERTICAL STEAM ENGINE

DOUBLE STANDARD.

With Patent Governor.



Nominal Horse Power		4	6	8	10	12	14
Diam. Steam Cylinder ...	ins.	6½	8	9	10	11¼	12
Revolutions per Minute ...	...	190	180	180	150	150	130
Price of Engine	£	34	45	55	70	88	105
Feed Pump	extra	50/-	60/-	60/-	80/-	80/-	100/-
Holding-down Bolts & Plates	"	20/-	25/-	25/-	40/-	40/-	50/-
Diam. Fly-wheel	ins.	35	40	40	50	54	60
Width Face, turned	"	5	6	6	8	9	10
Diam. Steam Inlet	"	1½	2	2	2½	2½	3
" Exhaust Outlet ...	"	2	2½	2½	3	3	3½
Weight Engine and Fly-wheel	cwts.	8¾	13¾	14¼	24¼	27¾	36½

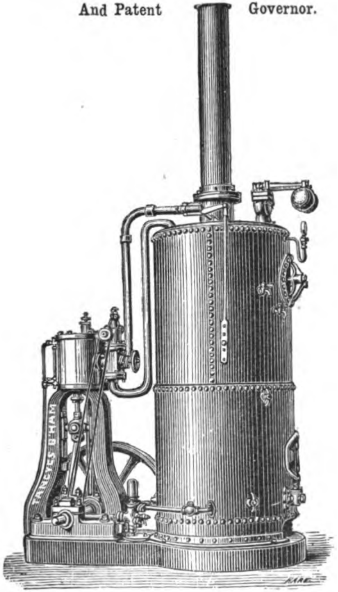
Note—With each Engine is supplied a Zinc Foundation Template and Oil Catcher.

TANGYES' VERTICAL STEAM ENGINE

DOUBLE STANDARD

WITH VERTICAL BOILER

And Patent Governor.



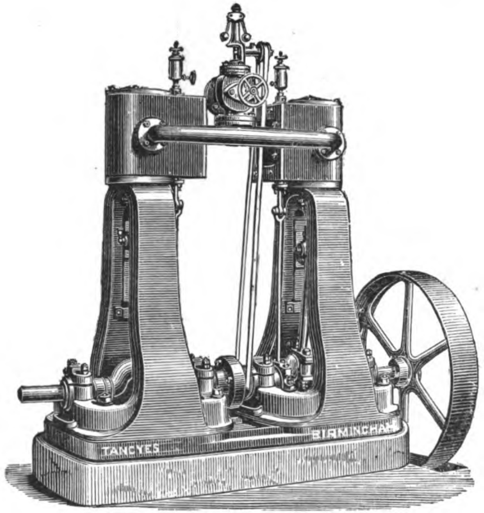
Nominal Horse Power ...	4	6	8	10	12	14
Diam. Steam Cylinder ins.	6½	8	9	10	11¼	12
Revolutions per Minute ...	190	180	180	150	150	130
Engine and Boiler, on Base, with Fd. Pump £	87	106	140	173	202	242
Mounted on Wheels ... £	95	120	...	...	...	...
Diam. Fly-wheel ... ... ins.	35	40	40	50	54	60
Width Face, turned ... "	5	6	6	8	9	10
Weight ... ... cwts.	37	48	62	90	101	125

For Vertical Boiler, see page 40.

TANGYES' VERTICAL STEAM ENGINE

COUPLED

With Patent Governor.



Nominal Horse Power	4	6	8	12	16	20	24	28
Diam. Steam Cylinders ins.	4	5	6½	8	9	10	11¼	12
Revolutions per Minute ...	240	240	190	180	180	150	150	130
Price Pair of Engines... £	43	58	74	97	118	150	188	230
Diam. Steam Inlet ... ins.	1½	1¾	2	2½	2½	3½	3½	4
" Exhaust Outlets (two) "	1¼	1½	2	2½	2½	3	3	3½

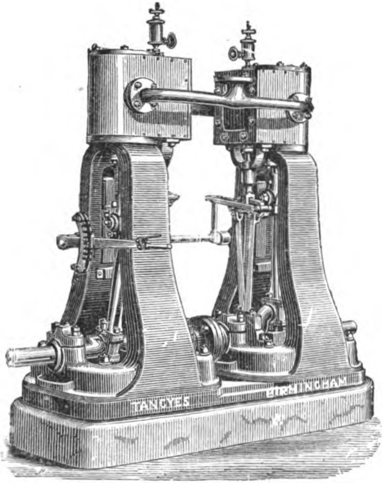
Feed Pump, extra.

Note.—The 4 *and* 6 *Horse-power Engines are same design as that shown on page* 18.

TANGYES' VERTICAL STEAM ENGINE

COUPLED

With Link Motion Reversing Gear.



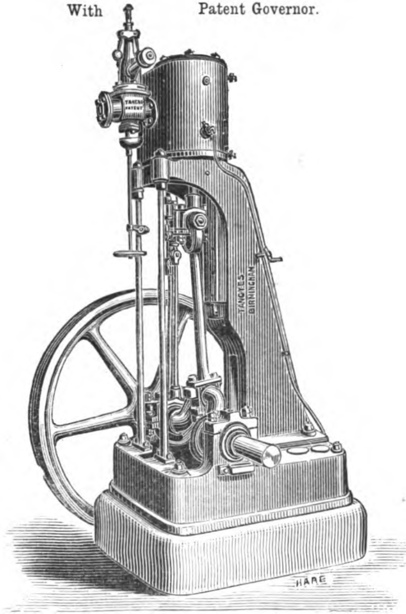
Nominal Horse Power ...	4	6	8	12	20	24	28
Diam. Steam Cylinders ins.	4	5	6½	8	10	11¼	12
Revolutions per Minute ...	240	240	190	180	150	150	130
Price Pair of Engines £	59	76	100	125	180	221	266
Diam. Steam Inlet ... ins.	1½	1¾	2	2½	3½	3½	4
" Exhaust Outlets (two) "	1¼	1½	2	2½	3	3	3½

A Stop Valve is included in Price.
No Governor nor Feed Pump supplied with this arrangement.

Note.—The 4 *and* 6 *Horse-power Engines are same design as that shown on page* 18

TANGYES' "CORNWALL" STEAM ENGINE

With Patent Governor.

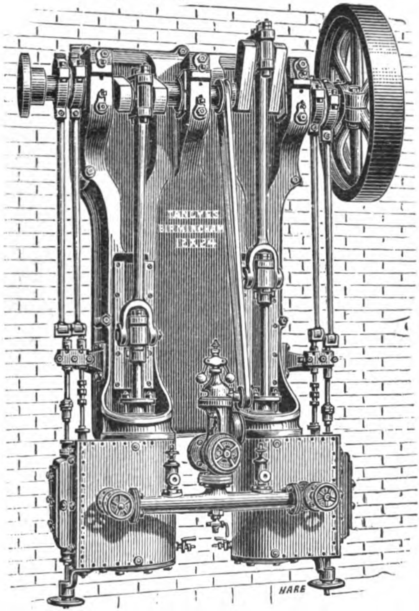


Steam jacketted cylinder lagged with sheet steel, steel cross-head, piston rod and valve spindles, wrought-iron crank shaft, connecting rod, and front columns.

Nominal Horse Power...	**14**	**16**
Diam. Steam Cylinder ... . ins.	**12**	**13**
Length Stroke ... ... "	**18**	**18**
Revolutions per Minute	**125**	**125**
Price of Engine ... ... £	**142**	**155**
Feed Pump with G.M. working parts, extra £	8	8
Variable Expansion Gear... ... ... " £	15	15
Holding-down Bolts and Plates ... " £	5	5
Fly-wheel ... ... ins.	72 × 9	78 × 9
Diam. Steam In and Outlets ... ... "	3 and 4	3 and 4

TANGYES' "BELFAST" STEAM ENGINE

Vertical, Coupled, with Patent Governor.

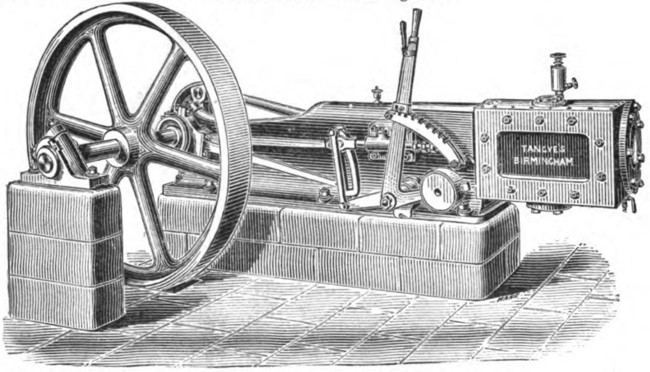


The illustration represents the Coupled "Belfast" Engine, described page 13, arranged to work vertically. To facilitate fixing against a wall a heavy Fly-wheel, of small diameter, is supplied with this arrangement. A Half Coupling, on each end of Shaft, is included in price.

Nominal Horse Power	20	28	32
Diam. Steam Cylinders ... ... ins.	10	12	13
Length Stroke ... ... "	18	24	24
Revolutions per Minute	130	125	125
Price of pair Engines ... ... £	240	284	310
Variable Expansion Gear ... extra £	36	38	38
Fly-wheel, in halves ... ... ins.	48 × 8	54 × 9	54 × 9
Diam. Steam In and Two Outlets "	3	3½	4

TANGYES' HORIZONTAL STEAM ENGINE

With Link Motion Reversing Gear



The illustration shows a back view of the "Tangye" Steam Engine, see page 4, with link motion reversing gear.

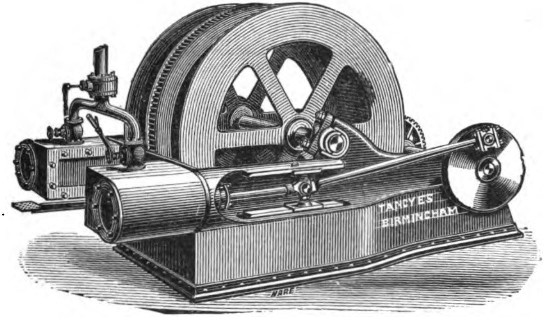
Size	D	E	G	H	I	J	J^A	K	M
Nominal Horse Power	4	6	8	10	12	14	16	20	25
Diam. Steam Cylinder ... ... ins.	6	8	9	10	11¼	12	13	14¼	16
Length Stroke ... ... "	12	16	18	20	20	24	24	28	28
Revolutions per Minute	120	100	90	85	85	75	75	65	65
Engine, with link motion and Fly-wheel ... ... £	57	80	95	122	132	142	159	191	218
Holding-down Bolts & Plates extra £	2	3	4 10	5	6	6	6	7 10	8
Diam. Fly-wheel ... ... ins.	48	54	60	66	66	72	72	90	108
Width Face, turned ... ... "	5	6	7	8	8	9	9	10	12
Diam. Steam Inlet ... ... "	1¼	1½	1¾	2	2½	2½	3	3½	4
" Exhaust Outlet ... ... "	1¾	2¼	2½	3	3½	3½	4	4½	5

A Stop Valve is included in price.
The H, I, J, J^A, K, and M sizes, have Steam Jacketted Cylinders.
Prices of Drums and Counter Gearing according to requirements.

For Steam Trap, see page 39.
No Governor nor Feed Pump supplied with this arrangement.

TANGYES' WINDING ENGINE

With Link Motion Reversing Gear.



The illustration represents the 20 H.P. size.

These Engines are mounted, with drums and gearing, on a strong wrought-iron frame.

Steam connecting pipes, between cylinders, and starting valve, are included in price.

Engines with double cylinders and double drums.

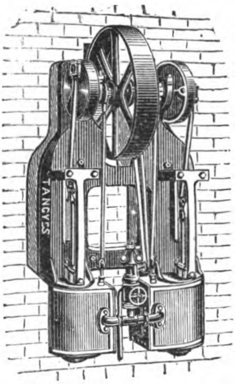
Nom. H.P.	Diam. Steam Cyls.	Length Stroke	Revs. per min.	DRUMS		Depth of Cheeks	Speed of rope miles per hour	PRICE	
				Diam.	Width			Two drums keyed on Shaft and one Brake	Two drums loose with clutch gear and double Brake
10	7 ins.	12 ins.	150	30 ins.	10 ins.	8 ins.	3¼	£182	£210
16	9 "	16 "	120	36 "	12 "	10 "	3½	250	280
20	10 "	18 "	110	42 "	13 "	10 "	4	300	340
28	12 "	20 "	100	54 "	14 "	12 "	4½	365	410
ENGINE WITH SINGLE CYLINDER AND SINGLE DRUM.									
5	7 ins.	12 ins.	150	30 ins.	10 ins.	8 ins.	3¼	£132	£144
8	9 "	16 "	120	36 "	12 "	10 "	3½	170	185

The Gearing can be altered to suit other speeds.

TANGYES'

DOUBLE-CYLINDER WALL STEAM ENGINE

With Patent Governor.

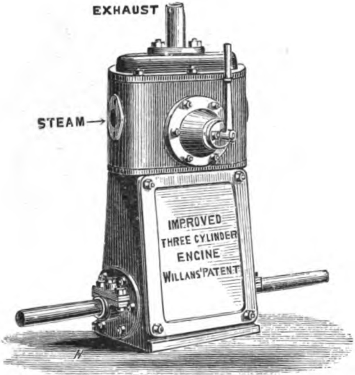


Nominal Horse Power	4	6	8
Diam. Steam Cylinders ins.	4	5	6
Length Stroke ... ... "	8	10	12
Revolutions per Minute ...	180	144	120
Price Engine ... ... £	50	68	80
Diam. Pulley, in halves ... ins.	20	27	36
Width Face, turned ... ... "	5½	7	8
Diam. Steam Inlet ... ... "	1	1½	1¾
" each Exhaust Outlet "	1¼	1½	1¾
Weight ... ... cwts.	7½	13½	16½

It will be seen that these Engines can be placed to work horizontally by simply altering the position of the Governor.

WILLANS' PATENT

THREE-CYLINDER ENGINE



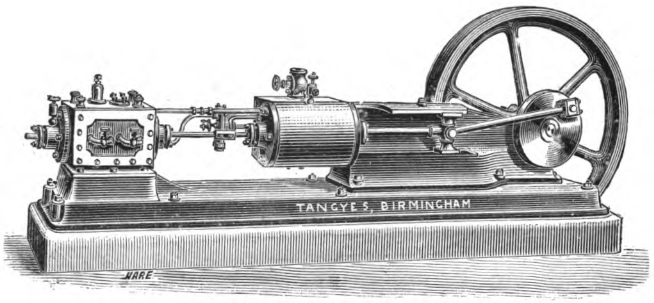
This Engine is exceedingly simple in construction, having neither eccentrics nor separate slide valves. It consists of three inverted cylinders cast in one piece parallel to each other. Upon the side of the cylinders is a valve and lever, by which the Engine may be started, stopped, and reversed. All the working parts are contained in the cylinder casing.

For hoisting operations, and especially for use in Foundries and, other purposes where precision in raising and lowering is important, this Engine will be found very suitable.

Diam. Steam Cylinders	ins.	**4**	**5**	**6**
Length Stroke	"	**4**	**5**	**6**
Revolutions per Minute	...	**400**	**400**	**350**
Price Engine	£	**55**	**65**	**85**
Governor	extra £	5 10	6	9

Driving pulleys or gear can be attached at either end of the Crank-shaft to suit requirements.

TANGYES' HORIZONTAL AIR-COMPRESSOR



This arrangement consists of a "Tangye" Steam Engine combined with an improved Air-Compressor, the whole mounted on strong cast-iron base. The Inlet and Outlet Valves are large in area, the Air Cylinder is fitted with Spray Pipe and Valve and is water jacketted, the water being circulated by a pump worked by engine. The Fly-wheel is of sufficient weight to overcome the resistance of air at end of stroke. Governor not supplied, being unnecessary.

For pressures above 40 lbs. per square inch we recommend a pair of coupled Engines, see page 6.

No.	1	2	3	4	5	6	7	8
Nominal Horse Power	4	6	8	10	12	14	20	25
Diam. Steam Cyl. ins.	6	8	9	10	11¼	12	14¼	16
" **Air Cyl.** ... "	6	8	9	10	11¼	12	14¼	16
Length Stroke ... "	12	16	18	20	20	24	28	28
Cub. ft. Air delivered per Min. at atmospheric pressure	46	95	132	165	210	235	336	420
Price ... ... £	85	120	140	180	200	220	280	325
Weight ... ... cwts.	30	43	56	78	81	108	154	178

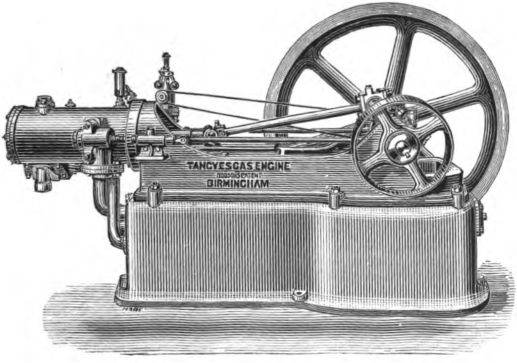
Prices include Stop Valve, but not Feed Pump.

THE "TANGYE" GAS ENGINE

(Robson's Patent.)

ROYAL CORNWALL POLYTECHNIC SPECIAL GOLD MEDAL, 1882,

(Also for Gas Producer and Feed Pump.)



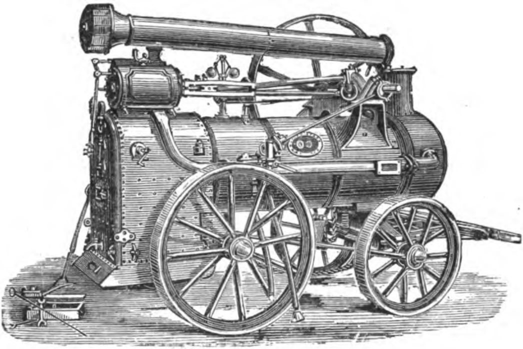
The ½, 2½ and 4 H.P. sizes are of the type shewn in illustration.
The 1 H.P. size is of the type of the "Tangye" Steam Engine.

Working Size	½ H.P.	1 H.P.	2½ H.P.	4 H.P.
Test Horse Power	1	1.4	3	6
Revolutions per Minute	180	170	170	160
Price, Engine on Base with Tank ... ... £	**60**	**82**	**115**	**140**

Note.—The Test Horse Power in the table above is that given off at the Driving Pulley in actual test with Dynamic Brake at our Works.

PORTABLE STEAM ENGINE

Single Cylinder.



(This illustration represents the 4, 5, 6, *and* 7 *H.P. Engines. They are supplied with Patent Steam Blast Tube Cleaner and Patent Feed Water Heater.)*

In these Engines the cylinders are steam jacketted, and are of large diameter and stroke. The Boilers have an average heating surface of 20 square feet per horse power. Mounted on either wood or wrought-iron wheels as required. Complete set of spanners and firing tools, funnel, tube brush, oil feeder, and waterproof cover supplied.

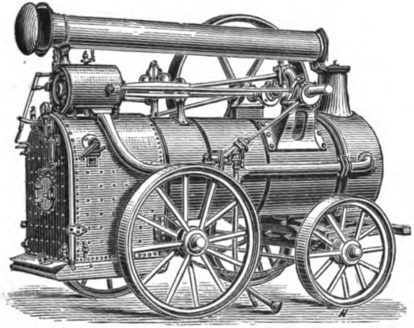
Nominal Horse Power ...	**2½**	**3**	**3½**	**4**	**5**	**6**	**7**
Diam. Cylinder ... ins.	**5¼**	**6¼**	**6½**	**6¾**	**7⅜**	**8½**	**9**
Stroke... ... ... "	**8**	**9**	**9**	**10**	**12**	**12**	**14**
Revolutions per Minute	**180**	**150**	**150**	**140**	**130**	**130**	**120**
Price ... ... £	**110**	**125**	**140**	**150**	**165**	**180**	**195**
Diam. Fly-wheel ... ins.	42	48	48	54	60	60	66
Diam. Crank Shaft ... "	2	2¼	2¼	2½	2¾	2¾	3
Weight, minus Case... cwts.	32	40	43	50	65	72	81
Weight, with Case ... "	39	47	52	59	75	83	95
Cubic Feet	140	200	220	268	328	380	420
Packed for Short Voyage ...	7/6	10/-	10/-	12/6	12/6	15/-	15/-
Packed for Long Voyage £	2 10	3 0	3 10	4 0	5 0	6 0	7 0

If with Link Motion Reversing Gear, £15 extra.

Note.—The first three sizes are not supplied with Patent Feed Water Heater.

PORTABLE STEAM ENGINE

Single Cylinder.



The Cylinders, steam jacketted, have now upwards of nine circular inches piston area per nominal Horse Power. The Boilers have been enlarged, and possess 20 ft. and upwards of heating surface per Horse Power. The Crank Shaft Brackets are stayed to Cylinder in improved manner, shown in illustration. The Crank Shaft and working parts generally have been considerably enlarged and strengthened. The Patent Feed Water Heater and the Patent Steam Blast Tube Cleaner are fitted to all the undernoted sizes. The Boiler Fittings comprise:—

Stop Valve, 2 Safety Valves, 1 Spring Balance (and other in locked case,) 1 Signal Whistle, Steam Gauge, Glass Water Gauge, 2 Gauge Cocks, Blow-off Cock, Mud Holes, Man Hole, and their Covers.

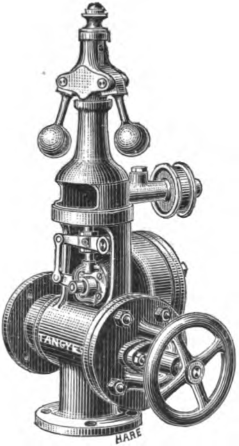
Nominal Horse Power ...	**8**	**9**	**10**	**12**
Diam. Cylinder ... ins.	**10**	**10½**	**11**	**12**
Stroke ... ... "	**14**	**14**	**14**	**14**
Revolutions per Minute ...	**120**	**120**	**120**	**120**
Price ... ... £	**210**	**225**	**240**	**280**
Diam. Fly-wheel ... ins.	66	66	66	66
Width turned Face ... "	6½	7	8	8
Diam. Crank Shaft ... "	3¼	3½	3¾	3¾
Weight, minus Case ... cwts.	93	100	106	114
Weight, with Case ... "	107	114	120	129
Cubic feet	464	526	550	570
Packed for Short Voyage ...	15/-	15/-	20/-	25/-
Packed for Long Voyage £	8	9	10	12

If with Link Motion Reversing Gear, £15 extra.

N.B.—Iron Wheels increase the weight by three or five cwt.

THE "ELECTRIC" GOVERNOR

Tangyes' Patent.



In this new form of Governor the internal spring, acting as a counter balance and a Speeder, is now used in **TENSION**, instead of in compression, as heretofore, and being placed in the top, cannot get clogged with oil and dust.

The power is conveyed by a lever to the regulating valve, which is in perfect equilibrium, and is worked eccentrically on the spindle, so that a small movement of the pendulums will open the valve to the full extent. The valve can be examined or withdrawn without removing the Governor.

The gun-metal spindle is carried in double bearings, and works with a cone steam joint, thus avoiding the friction and leakage inseparable from a stuffing box and gland.

The arm carrying the driving pulley can be placed at any angle by unscrewing the set pin. No vegetable oil should be used for lubricating Governors.

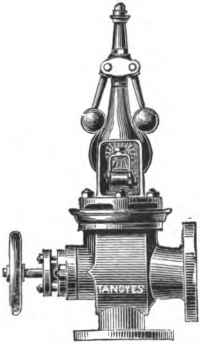
Governor can be supplied with or without stop valve.

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Diam. Steam Pipe. ins.	¾	1	1¼	1½	1¾	2	2½	3	3½	4	4½	5	5½	6
" Driving Pulley "	2	2	2	2	3	3	3	3¾	3¾	3¾	4	4	4	4
Revs. per Minute ...	400	400	400	400	300	300	300	250	250	250	210	210	210	210
Centre of Governor to centre of Pulley } ins.	4⅞	4⅞	4⅞	5¾	6⅝	6⅝	8½	10⅛	10⅛	10⅛	11⅝	11⅝	11⅝	11⅝
Diam. Flanges ... ins.	4½	4½	4½	5	6	6	7	8	8½	9	9¾	10½	11½	12
Price ... ... £	4 10	5	6	7	8	9	10	13	16	18	21	24	27	30

Special extra Speeder for regulating whilst in motion, and for closing Equilibrium Valve should driving strap break, extra.

IMPROVED HIGH-SPEED GOVERNOR

Tangyes' Patent.



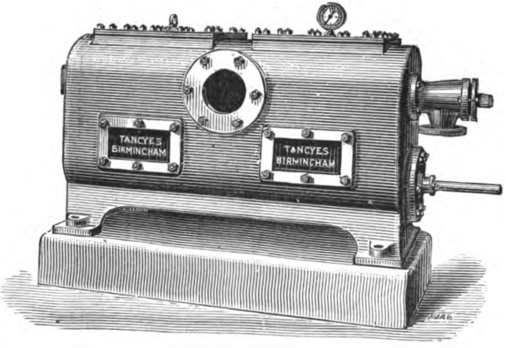
Combines in the small space usually occupied by the ordinary Steam Stop Valve, a Governor, Throttle Valve, and Stop-Valve complete. It is exceedingly simple and compact, and being driven at high speed is very sensitive.

The Governor has been rendered much more sensitive and effective by the substitution of an almost frictionless arrangement for the Stuffing-box. The new arrangement consists of a pair of levers and a small cross spindle on which is a cone surface; the joint being made and kept tight simply by the pressure of the steam on the back of the cone.

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Diam. Steam Pipe, ...ins.	¾	1	1¼	1½	1¾	2	2½	3	3½	4	4½	5	5½	6
" Driving Pulley "	2	2	2	2	3	3	3	3¾	3¾	3¾	4	4	4	4
Revs. per Minute	400	400	400	400	300	300	300	250	250	250	210	210	210	210
Centre of Governor to centre of Pulley ins.	4⅞	4⅞	4⅞	5¾	6⅝	6⅝	8½	10⅛	10⅛	10⅛	11⅝	11⅝	11⅝	11⅝
Diam. Flanges ... ... ins.	4½	4½	4½	5	6	6	7	8	8½	9	9¾	10½	11½	12
Price ... ... £	4 10	5	6	7	8	9	10	13	16	18	21	24	27	30

TANGYES'

HORIZONTAL AIR-PUMP CONDENSER



One Condenser can be arranged to take the Steam from a number of Engines and an arrangement of this kind worked by an independent Engine can be supplied.

The Air Pump, Barrel, Bucket, Valve Seats, Guards, and Injection Spray Pipe are of gun-metal.

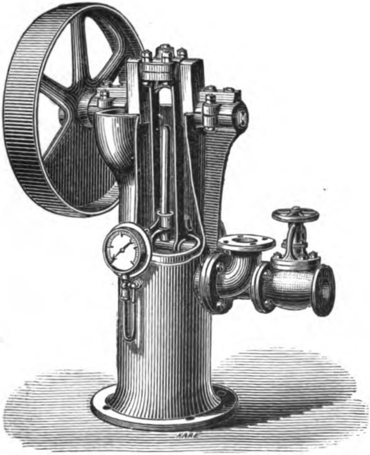
Size ... ...**No.**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
For Cyls. diam. ... ins.	6	7	8	9	10	12	14	16	18	20	22	24	26	28	30
Steam Press., lbs. sq. in.	60	60	60	60	50	50	50	50	50	50	50	50	50	50	50
Piston speed, ft. per min.	240	240	260	270	300	300	300	300	300	300	300	300	300	300	300
Stroke Air Pump ... ins.	12	14	16	18	20	24	28	32	36	40	44	48	52	56	60
Injection Inlet diam. "	¾	¾	1¼	1¼	1½	1¾	2	2¼	2½	2½	3	3	3½	3½	4
Exhaust Branch " "	1¾	1¾	2¼	2½	3	3	4½	5	5½	6	7	7	8	8	9
Discharge " "	1½	1½	2	2¼	2½	3	3½	4	4½	5	6	6	7	7	8
Price ... ... £	**25**	**27**	**30**	**33**	**35**	**40**	**50**	**55**	**60**	**70**	**75**	**85**	**90**	**95**	**100**

Injection Valve and Vacuum Gauge are included in prices.

"Tangye" Steam Engine arranged with this Condenser, see page 7.

TANGYES'

VERTICAL AIR-PUMP CONDENSER

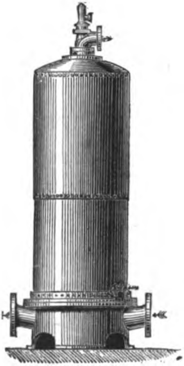


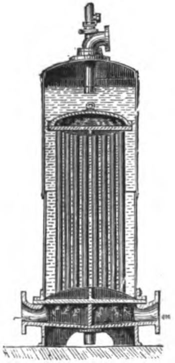
This Condenser is so arranged that it may be placed in any convenient situation contiguous to an existing line of shafting, to be worked from same by a belt. It may be fixed at any reasonable distance away from an Engine, the exhaust steam being brought to it by a line of pipe.

Size ... ... **No.**	1	2	3	4	5
For Engines, with Cyls. diam. ... ... ins.	8	10	15	20	24
Steam Pressure ... ... lbs. per sq. in.	50	50	50	50	50
Max. Piston Speed ... ... ft. per min.	270	300	300	350	350
Air Pump, diam. ... ... ins.	5	7	10	13½	16
" " Stroke ... ... "	9	12	15	17	20
Revolutions per Minute	40 to 90	55 to 75	45 to 55	40 to 50	35 to 45
Injection Inlet, diam. ... ... ins.	2	2½	3	3½	4
Exhaust Branch, " ... ... "	2½	4	6	8	10
Discharge, " ... ... "	2¼	4	6	7	8
Pulley, " ... ... "	24	30	46	56	60
Width Face, turned ... . "	5	5	8	10	11
Price... ... ... £	**35**	**45**	**60**	**85**	**110**

Pulley, Injection Valve and Vacuum Gauge are included in prices.

TANGYES' FEED WATER HEATER





In this Heater the tubes are of solid drawn brass or copper, and are free to expand or contract. The difference between the expansion of brass and scale, prevents the adherence of the latter to the tubes, thus keeping them clean, and their heating surface always effective. The casings are of best boiler plate, double rivetted in all but the first two sizes. Each Heater is fitted with mud-cock and hand-hole, by means of which it may be cleaned out, also, blow-off cock and feed relief valve.

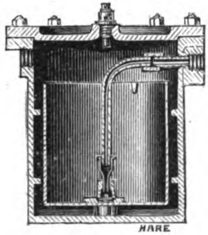
The tubes present an area considerably in excess of that of the exhaust pipe, thus preventing back pressure.

Diam. Exhaust Pipe ins.	2	2½	3	3½	4	4½	5
" Casing ... "	13	13	18	18	23	23	23
Length Casing ... "	39	48	54	60	60	66	72
Price ... ... £	**13**	**19**	**25**	**30**	**36**	**42**	**50**
Diam. Exhaust Pipe ins.	6	7	8	9	10	12	14
" Casing ... ... "	30	30	35	36			
Length Casing ... "	78	84	87	90			
Price... ... ... £	**65**	**85**	**105**	**120**	**135**	**170**	**200**

Each Heater is tested by hydraulic pressure to 140 lbs. per square inch before leaving our Works.

SELF-ACTING STEAM TRAP

For Discharging the Water resulting from the Condensation of Steam in Pipes Steam Chests, Vacuum Pans, Drying Apparatus, &c.

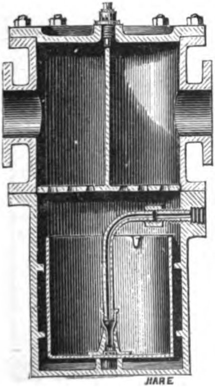


No.	Diam. Inlet and Outlet	Height and Width	For Pipes	Price
	ins.	ins. ins.	ins. ins.	
1	¾	13×11	2 to 3½	£1 15
2	1	18×16½	4 " 6	2 2
3	1½	28×19½	6½ " 8	5 10
4	2	37×25½	8½ " 10	8 0

DIRECTIONS FOR FIXING.

Insert a Tee-piece in the lowest part of the line of steam pipe where the water accumulates, and carry a pipe from thence to "INLET" of Steam Trap, which may be placed in any convenient situation below. The "OUTLET" in Steam Trap is simply to receive a pipe to convey the condensed water to a drain or elsewhere.

SELF-ACTING STEAM TRAP & SEPARATOR



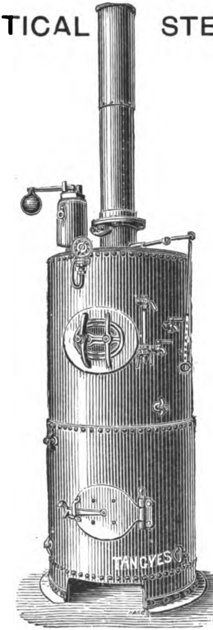
This Trap is for the same purpose as that above described, but is fitted with an upper chamber or Separator having deflectors for intercepting the water.

The whole of the steam passes through the Separator, and in doing so is diverted by the diaphragm. By this means the water is caught in the Separator, and falls into the Trap, from which it is discharged in the usual way.

No.	Diam. Inlet and Outlet	Height and Width	For Pipes	Price
	ins. ins.	ins. ins.	ins. ins.	
1	2 to 3½	22½×12½	2 to 3½	£2 15
2	4 " 6	30½×18	4 " 6	3 10
3	6½ " 8	44 ×24	6½ " 8	7 10
4	8½ " 10	57 ×30	8½ " 10	12 0

NOTE.—In ordering state diam. of pipes and length of range for which the Trap is intended.

TANGYES' VERTICAL STEAM BOILER



This Boiler is made of "B" and "BB" Staffordshire Plates, and is fitted with "BBB" Iron Cross Tubes and Uptake.

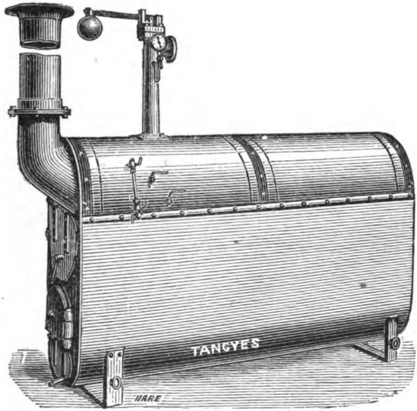
Each Boiler is tested by hydraulic pressure to 100 lbs. per square inch before leaving our Works.

The price includes the following Furnace and Steam fittings, viz,: Fire-door, bearer and fire bars, damper and frame, man and mud-hole covers and cross bars, chimney 7 feet long, safety valve, stop valve, back pressure valve, glass water gauge, two trial cocks, blow-off cock, and dial pressure gauge.

Size	Horse Power	Height	Diam.	Cross Tubes	Weight, with Fittings	**Price**
A	1	4ft. 6ins.	2ft. 0ins.	1	10 cwts.	£22
B	2	5 " 0 "	2 " 3 "	1	12 "	28
C	3	5 " 8 "	2 " 6 "	1	14 "	34
D	4	6 " 6 "	2 " 10 "	2	18 "	42
E	6	7 " 2 "	3 " 2 "	2	25 "	47
G	8	8 " 2 "	3 " 8 "	3	38 "	68
H	10	9 " 0 "	4 " 0 "	3	50 "	85
I	12	9 " 8 "	4 " 4 "	4	60 "	95
J	14	10 " 2 "	4 " 7 "	4	67 "	115

Injector or Feed Pump, extra.

TANGYES' "COLONIAL" TUBULAR BOILER



This Boiler, which is small in diameter, hence very strong, has large heating surface, and the firegrate space can be altered in length for burning any kind of rough fuel. It is fired on the outside of the large tube, the flame passing along and returning through the tubes to the smoke box, the heat thus being almost entirely absorbed. There is no dangerous furnace crown liable to be overheated through shortness of water. All parts exposed to the action of the fire are under water. The boiler, flue, and tubes are thoroughly accessible for cleaning.

Each Boiler is tested by hydraulic pressure to 120 lbs. per square inch before leaving our Works.

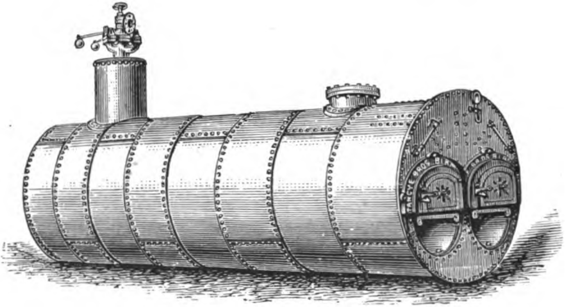
Nom. H.P.	Size	Length of Tubes	No. of Tubes	Heating surface	Price	PRICE, lagged with sheet-steel & painted in a superior manner
4	60 ins. × 24 ins.	46 ins.	12	48 sq. ft.	£40	£44
6	66 " × 27 "	50 "	16	66 "	45	51
8	90 " × 30 "	71 "	20	114 "	60	68
10	132 " × 33 "	111 "	24	200 "	90	99
12	144 " × 36 "	113 "	28	240 "	105	116
14	156 " × 39 "	119 "	30	280 "	120	132
18	156 " × 45 "	119 "	40	360 "	155	172

THE PRICE INCLUDES THE FOLLOWING FURNACE AND STEAM FITTINGS, VIZ.:

Cast-iron furnace front and door, bearers, dead-plate and fire-bars, wrought-iron chimney 7 feet long, smoke box and ash pit doors and damper, mud hole covers and cross-bars, safety valve, stop valve, back pressure valve, glass water gauge, two trial cocks, blow-off cock, dial pressure gauge, fire-brick lining and bridge and tube brush.

Injector or Feed Pump, extra.

TANGYES' LANCASHIRE STEAM BOILER



This Boiler is made of "B" Staffordshire plates; "BB" and "BBB" iron being used where necessary. All the horizontal seams are double rivetted and each Boiler is tested by hydraulic pressure to 100 lbs. per square inch before leaving our Works. A working tracing is supplied, with particulars for setting in brickwork.

For convenience of shipment this Boiler is also supplied in halves, or in loose plates ready punched, fitted, and marked for rivetting together on arriving at destination.

Size	Horse Power	Length	Diam.	Diam. Tubes	Diam. Dome	Height Dome	Weight	Price
O	30	22 ft.	6ft. 0ins.	27 ins.	33 ins.	43 ins.	9 tons	£205
P	35	24 "	6 " 3 "	28½ "	34 "	45 "	11½ "	244
S	40	26 "	6 " 6 "	30 "	35 "	47 "	13 "	283
T	45	28 "	6 " 9 "	31½ "	36 "	49 "	14 "	302
W	50	30 "	7 " 0 "	33 "	37 "	51 "	15½ "	340

THE PRICE INCLUDES THE FOLLOWING FURNACE AND STEAM FITTINGS, VIZ.:

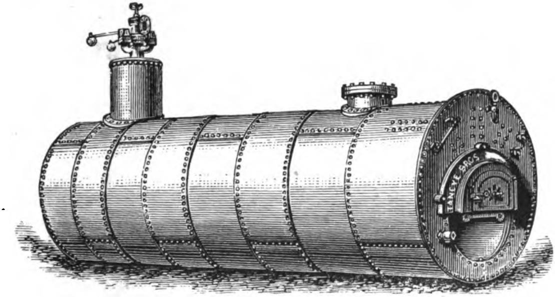
Two wrought-iron furnace fronts with cast-iron doors, bearers, dead plate, fire bars, damper and frame, two man-hole rings and covers, safety-valve, stop-valve, back pressure-valve, two glass water-gauges, blow-off cock and bend, dial pressure gauge, and two fusible plugs.

Anti-priming Pipe, in place of Dome, if preferred.

If with Low Moor Iron over fire, or arranged for burning wood, extra.
Galloway Tubes to any of above Boilers 50/- per Tube extra.
Injector or Feed Pump, extra.

Feed Water Heater, see page 38.

TANGYES' CORNISH STEAM BOILER



This Boiler is made of "B" Staffordshire plates; "B B" and "B B B" iron being used where necessary. Each Boiler is tested by hydraulic pressure to 100 lbs. per square inch before leaving our Works. A working tracing is supplied, with particulars for setting in brickwork.

For convenience of shipment this Boiler is also supplied in halves, or in loose plates ready punched, fitted, and marked for rivetting together on arriving at destination.

Size	Horse Power	Length	Diam.	Diam. Tube	Diam. Dome	Height Dome	Weight	Price
C	4	9 ft.	3 ft. 0 ins.	20 ins.	16 ins.	22 ins.	27 cwts.	£48
D	6	10 "	3 " 3 "	21 "	18 "	24 "	32 "	55
E	8	12 "	3 " 8 "	24 "	20 "	26 "	42 "	70
G	10	14 "	4 " 0 "	26 "	22 "	28 "	62 "	85
H	12	16 "	4 " 3 "	28 "	23 "	30 "	76 "	102
I	14	17 "	4 " 6 "	29 "	24 "	32 "	86 "	114
J	16	19 "	4 " 8 "	31 "	26 "	33 "	98 "	128
K	22	21 "	4 " 10 "	32 "	27 "	35 "	113 "	143
M	28	24 "	5 " 1 "	34 "	28 "	36 "	130 "	180

THE PRICE INCLUDES THE FOLLOWING FURNACE AND STEAM FITTINGS, VIZ:

Wrought-iron furnace front, with cast-iron door, bearers, dead plate, fire bars, damper and frame, man-hole ring and cover, safety valve, stop valve, back pressure valve, glass water-gauge, two trial cocks, blow-off cock and bend, dial pressure gauge and fusible plug.

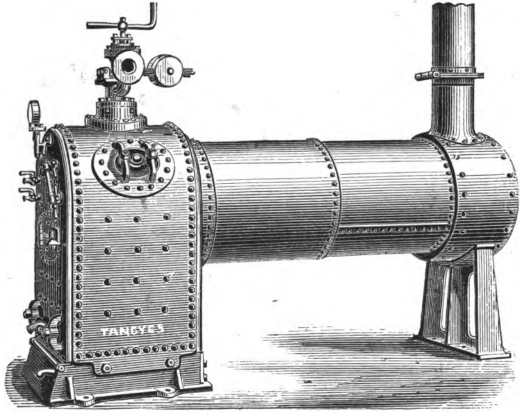
Anti-priming pipe, in place of Dome, if preferred.

If with Low Moor Iron over fire, or arranged for burning wood, extra.
Galloway Tubes to any of above Boilers, 50/- per Tube extra.
Injector or Feed Pump, extra.

Feed Water Heater, see page 38.

TANGYES'

SEMI-PORTABLE MULTITUBULAR BOILER



This Boiler is made with an internal fire-box entirely of Low-Moor, Bowling or iron of equal quality, and is provided with a set of best lap-welded tubes, 2½ inches external diameter. It is mounted on a cast-iron ash-pan, with draught regulating door fire box end, and a cast-iron standard at smoke-box end.

Each Boiler is tested by hydraulic pressure to 140 lbs. per square inch before leaving our Works.

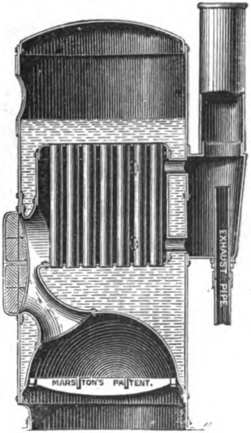
Nom. H.P.	Diam. Body	Length over all	Price	Price on Wheels	Nom. H.P.	Diam. Body	Length over all	Price	Price on Wheels
4	2ft. 1in.	8ft. 9in.	£64	£74	10	2ft. 10in.	11ft. 1in.	£104	£119
5	2 " 3 "	9 " 3 "	70	80	12	3 " 0 "	11 " 11 "	114	130
6	2 " 5 "	9 " 5 "	77	89	14	3 " 5 "	12 " 6 "	136	152
7	2 " 5 "	9 " 11 "	83	95	16	3 " 7 "	13 " 4 "	161	183
8	2 " 7 "	10 " 4 "	90	104	18	3 " 11 "	13 " 9 "	190	212
9	2 " 7 "	10 " 10 "	95	109	20	3 " 11 "	14 " 4 "	220	250

Injector or Feed Pump, extra. **Lagging Body, extra.**

THE PRICE INCLUDES THE FOLLOWING FURNACE AND STEAM FITTINGS, VIZ.:

Fire door, fire bars and bearers, wrought-iron smoke box and door, chimney the length of the Boiler, cast-iron ash-pan and standard, wrought-iron ash-pit door and damper combined, man and mud hole covers and cross-bars, safety valve, stop valve, back pressure valve, glass water gauge, two trial cocks, blow-off cock, dial pressure gauge, fusible plug and tube brush.

PATENT
VERTICAL MULTITUBULAR BOILER



Each Boiler is tested, by hydraulic pressure, to 120 lbs. per square inch before leaving our Works.

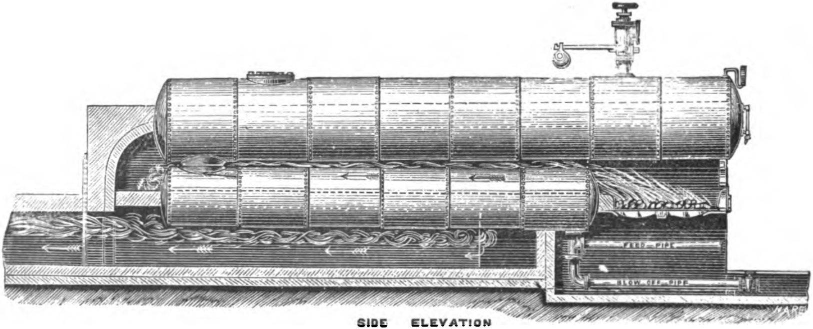
Nominal Horse Power	Height	Diameter	Weight	Price
2	4ft. 6in.	2ft. 0in.	10 cwts.	£35
3	5 " 0 "	2 " 3 "	12 "	45
4	5 " 8 "	2 " 6 "	14 "	55
6	6 " 6 "	2 " 10 "	22 "	67
8	7 " 2 "	3 " 2 "	27 "	89
10	8 " 2 "	3 " 8 "	37 "	105
14	9 " 0 "	4 " 0 "	54 "	120
16	9 " 8 "	4 " 4 "	63 "	140
20	10 " 2 "	4 " 7 "	72 "	160

Injector or Feed Pump, extra.

THE PRICE INCLUDES THE FOLLOWING FURNACE AND STEAM FITTINGS, VIZ.:

Fire door and frame, soot door and damper combined, smoke box and doors, fire bars and bearer, man and mud hole covers and cross bars, chimney 7 feet long, safety valve, stop valve, back pressure valve, glass water gauge, two trial cocks, blow-off cock, and dial pressure gauge.

THE "KESTERTON" PATENT BOILER



SIDE ELEVATION

Each Boiler is tested by hydraulic pressure to 160lbs. per square inch before leaving our Works.

10 Horse-Power	2 Tubes	£92	40 Horse-Power	4 Tubes	£250
15 " "	2 "	112	45 " "	4 "	265
20 " "	2 "	130	50 " "	4 "	280
25 " "	2 "	140	60 " "	4 "	300
30 " "	2 "	155	70 " "	4 "	330
35 " "	4 "	220			

THE PRICE INCLUDES THE FOLLOWING FURNACE AND STEAM FITTINGS, VIZ.:

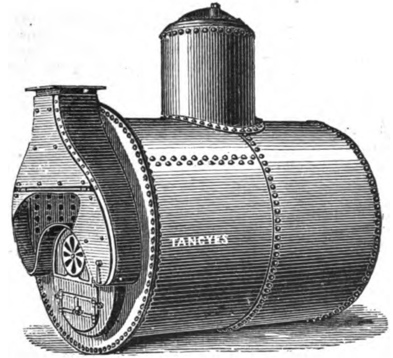
Wrought-iron furnace front with cast-iron door, bearers, dead plate, fire bars, damper and frame, two manhole rings and covers, safety valve, stop valve, glass water gauge, two trial cocks, blow-off cock and pipes extending to boiler, back pressure valve and pipes extending to boiler, dial pressure gauge, and anti-priming pipe.

In sizes where two pairs of Cylinders are employed there is a difference as follows: *two* fire doors, *four* manhole rings and covers, *two* safety valves, *two* glass water gauges, *no* trial cocks, *two* pressure gauges and cast-iron steam connecting pipe.

Injector or Feed Pump, extra.

TANGYES'

MULTITUBULAR MARINE BOILER



This Boiler is made of "B," "BB," and "BBB," Staffordshire Plates, and is fitted with best lap-welded tubes, 3 in. external diameter, and stay tubes.

Each Boiler is tested by hydraulic pressure to 140 lbs. per square inch before leaving our Works.

Nom. Horse Power	Length	Diameter	No. of Tubes	Size of Dome	No. and Diam. of Furnaces	Weight	Price
8	6 ft.	5 ft. 0 in.	36	24 × 24 ins.	**1.** 26 ins.	65 cwts.	**£125**
12	7 "	5 " 3 "	38	26 × 26 "	**1.** 28 "	75 "	**145**
20	8 "	5 " 6 "	40	28 × 28 "	**1.** 30 "	85 "	**210**
30	9 "	8 " 0 "	80	36 × 28 "	**2.** 32 "	240 "	**420**

THE PRICE INCLUDES THE FOLLOWING FURNACE AND STEAM FITTINGS, VIZ:

Wrought-iron furnace front, with cast-iron door, wrought-iron damper and ash-pit doors, cast-iron bearers, dead-plate and fire-bars, man and mud-hole covers and cross bars, smoke-box fitted with doors, hinges and catches, chimney 10 feet long, safety valve, stop valve, back pressure valve, glass water gauge, two trial cocks, blow-off cock and bend, scum cock and collecting pan, dial pressure gauge, fusible plug, tube brush and steam whistle.

If fitted with Dead Weight or Spring Safety Valves, extra.

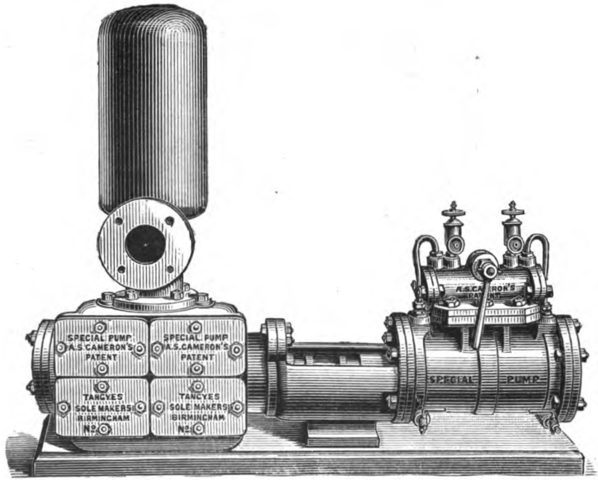
THE "SPECIAL" STEAM PUMP

Cameron and Floyd's Patents.

TANGYES LIMITED, SOLE MAKERS

The "Special" Double Acting Steam Pump is now made in some 200 sizes, and of many different designs to suit particular requirements.

In ordering state the purpose for which the Pump is required to ensure suitable pump valves being sent. Sections of some of the varieties of valves supplied are shown at pages 68 and 69.



IN CASE OF SPECIAL QUOTATIONS THE FOLLOWING PARTICULARS ARE REQUIRED, VIZ.:

Pressure of steam at cylinder.
Number of gallons to be raised in a given time.
The height of lift from level of water to point of delivery.
The nature of the fluid to be pumped.

For "Special" Steam Pump, with Holman's Condenser, see pages 52 *and* 53.

The "Special" Steam Pump can be worked by Compressed Air. For pumping Tar or Ammoniacal Liquor the "Special" Steam Pump is made with extra long distance piece, for which an extra charge is made.

For Vertical Special Steam Pump, see pages 50 *and* 51.

THE "SPECIAL" STEAM PUMP

Suitable for lifts up to 240 feet.

Diam. Steam Cyl. .. .. ins.	3	3	4	4	4	5	5	5	5	6
Diam. Water Cyl. .. .. 〃	1½	3	2	3	4	2½	3	4	5	3
Length Stroke .. .. .. 〃	9	9	9	9	9	12	12	12	12	12
Galls. per hour, approx.	450	1800	800	1800	3200	1250	1800	3200	5000	1800
Diam. Suction & Delivery ins.	1	2½	1¼	2½	2½	2	2½	3	3½	2½
〃 Steam Inlet .. .. 〃	½	¾	¾	¾	¾	¾	¾	¾	¾	1
〃 Exhaust Outlet .. 〃	¾	¾	1	1	1	1	1	1	1	1¼
Weight, approx. .. .. cwts.	1.1.0	2.3.7	2.1.14	3.2.0	3.3.0	3.2.0	3.3.0	4.2.0	6.0.0	4.1.22
Price .. .. £	**16**	**18**	**18**	**20**	**25**	**21**	**22**	**27**	**32**	**25**

Diam. Steam Cyl. .. .. ins.	6	6	6	7	7	7	7	7	8	8
Diam. Water Cyl. .. .. 〃	4	5	6	3	4	5	6	7	4	5
Length Stroke .. .. .. 〃	12	12	12	12	12	12	12	12	12	12
Galls. per hour, approx.	3200	5000	7200	1800	3200	5000	7200	9800	3200	5000
Diam. Suction & Delivery ins.	3	3½	4	2½	3	3½	4	5	3	3½
〃 Steam Inlet .. .. 〃	1	1	1	1¼	1¼	1¼	1¼	1¼	1½	1½
〃 Exhaust Outlet .. .. 〃	1¼	1¼	1¼	1½	1½	1½	1½	1½	1¾	1¾
Weight, approx. .. .. cwts.	5.1.14	7.0.14	9.2.10	4.3.0	5.2.8	7.3.0	8.3.0	12.0.7	6.3.20	9.0.0
Price .. .. £	**30**	**35**	**40**	**30**	**35**	**40**	**45**	**50**	**40**	**45**

Diam. Steam Cyl. .. .. ins.	8	8	8	9	9	9	9	9	10	10
Diam. Water Cyl. .. .. 〃	6	7	8	5	6	7	8	9	5	6
Length Stroke .. .. .. 〃	12	12	18	12	12	12	18	24	12	12
Galls. per hour, approx.	7200	9800	12800	5000	7200	9800	12800	16200	5000	7200
Diam. Suction & Delivery ins.	4	5	6	3½	4	5	6	7	3½	4
〃 Steam Inlet .. .. 〃	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
〃 Exhaust Outlet .. 〃	1¾	1¾	1¾	1¾	1¾	1¾	1¾	1¾	2	2
Weight, approx. .. .. cwts.	11.0.0	9.2.0	13.0.0	9.1.0	9.1.14	9.2.0	13.2.0	24.0.0	9.3.0	12.2.0
Price .. .. £	**50**	**55**	**65**	**50**	**55**	**60**	**70**	**85**	**55**	**60**

Diam. Steam Cyl. .. .. ins.	10	10	10	10	12	12	12	12	12	12
Diam. Water Cyl. .. .. 〃	7	8	9	10	6	7	8	9	10	12
Length Stroke .. .. .. 〃	12	18	24	24	18	18	18	24	24	24
Galls. per hour, approx.	9800	12800	16200	20000	7200	9800	12800	16200	20000	28800
Diam. Suction & Delivery ins.	5	6	7	8	4	5	6	7	8	9
〃 Steam Inlet .. .. 〃	1½	1½	1½	1½	2¼	2¼	2¼	2¼	2¼	2¼
〃 Exhaust Outlet .. 〃	2	2	2	2	2½	2½	2½	2½	2½	2½
Weight, approx. .. .. cwts.	15.0.0	18.0.0	26.0.0	27.2.0	18.2.0	19.0.0	19.2.10	27.0.0	30.0.0	36.0.0
Price .. .. £	**65**	**75**	**90**	**100**	**75**	**80**	**85**	**110**	**120**	**140**

Diam. Steam Cyl. .. .. ins.	14	14	14	14	14	14	16	16	16	16
Diam. Water Cyl. .. .. 〃	7	8	9	10	12	14	8	9	10	12
Length Stroke .. .. .. 〃	24	24	24	24	24	24	24	24	24	24
Galls. per hour, approx.	9800	12800	16200	20000	28800	39200	12800	16200	20000	28800
Diam. Suction & Delivery ins.	5	6	7	8	9	10	6	7	8	9
〃 Steam Inlet .. .. 〃	2½	2½	2½	2½	2½	2½	3	3	3	3
〃 Exhaust Outlet .. 〃	3	3	3	3	3	3	3½	3½	3½	3½
Weight, approx. .. .. cwts.	21.1.0	22.2.14	24.0.0	32.0.0	38.0.0	..	..	..	..	..
Price .. .. £	**110**	**120**	**130**	**140**	**160**	**180**	**140**	**150**	**160**	**170**

Diam. Steam Cyl. .. .. ins.	16	18	18	18	18	21	21	24	24	26
Diam. Water Cyl. .. .. 〃	14	9	10	12	14	12	14	12	14	14
Length Stroke .. .. .. 〃	24	24	24	24	24	36	36	36	36	48
Galls. per hour, approx.	39200	16200	20000	28800	39200	28800	39200	28800	39200	39200
Diam. Suction & Delivery ins.	10	7	8	9	10	9	10	9	10	10
〃 Steam Inlet .. .. 〃	3	3	3	3	3	3½	3½	4	4	4
〃 Exhaust Outlet.. .. 〃	3½	3½	3½	3½	3½	4	4	5	5	5
Price .. .. £	**190**	**160**	**170**	**185**	**200**	**250**	**265**	**265**	**285**	**340**

If with solid Brass Water Cylinder with Copper Air Vessel, extra.

Brass lining to Pump Barrel, extra, see page 66.

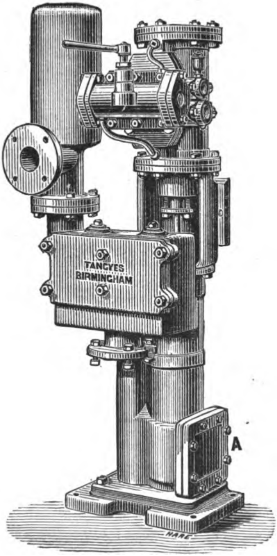
THE VERTICAL "SPECIAL" STEAM PUMP

Cameron & Floyd's Patents.

TANGYES LIMITED, SOLE MAKERS.

This Pump is arranged to work, if necessary, on chain slings, with ready means for attaching pipes.

The Door "A" is provided as a means of access to the Bucket



Quotations for Telescope Steam and Water Pipes for this Pump on application.
The "Special" Steam Pump can be worked by Compressed Air.

For Horizontal "Special" Steam Pump see pages 48 *and* 49.
For "Special" Steam Pump with Holman's Condenser see pages 52 *and* 53.

THE VERTICAL "SPECIAL" STEAM PUMP

Suitable for lifts up to 240 feet.

Diam. Steam Cyl. .. .. ins.	3	4	4	4	5	5	5	5	6	6
Diam. Water Cyl. .. .. 〃	3	2	3	4	2½	3	4	5	3	4
Length Stroke .. .. .. 〃	9	9	9	9	12	12	12	12	12	12
Galls. per hour, approx. ..	1800	800	1800	3200	1250	1800	3200	5000	1800	3200
Height, lift per lb. steam .. ft.	1·5	6·0	2·65	1·5	6·0	4·17	2·25	1·5	6·0	3·37
Diam. Suction & Delivery ins.	2½	1¼	2½	2½	2	2½	3	3½	2½	3
〃 Steam Inlet .. .. 〃	½	¾	¾	¾	¾	¾	¾	¾	1	1
〃 Exhaust Outlet .. 〃	¾	1	1	1	1	1	1	1	1¼	1¼
Price .. .. £	18	18	20	25	21	22	27	32	25	30

Diam. Steam Cyl. .. .. ins.	6	6	7	7	7	7	7	8	8	8
Diam. Water Cyl. .. .. 〃	5	6	3	4	5	6	7	4	5	6
Length Stroke .. .. .. 〃	12	12	12	12	12	12	12	12	12	12
Galls. per hour, approx. ..	5000	7200	1800	3200	5000	7200	9800	3200	5000	7200
Height, lift per lb. steam .. ft.	2·25	1·5	8·0	4·5	2·95	2·04	1·5	6·0	3·75	2·65
Diam. Suction & Delivery ins.	3½	4	2½	3	3½	4	5	3	3½	4
〃 Steam Inlet .. .. 〃	1	1	1¼	1¼	1¼	1¼	1¼	1½	1½	1½
〃 Exhaust Outlet .. 〃	1¼	1¼	1½	1½	1½	1½	1½	1¾	1¾	1¾
Price .. .. £	35	40	30	35	40	45	50	40	45	50

Diam. Steam Cyl. .. .. ins.	8	8	9	9	9	9	9	10	10	10
Diam. Water Cyl. .. .. 〃	7	8	5	6	7	8	9	5	6	7
Length Stroke .. .. .. 〃	12	18	12	12	12	18	24	12	12	12
Galls. per hour, approx, ..	9800	12800	5000	7200	9800	12800	16200	5000	7200	9800
Height, lift per lb. steam .. ft.	2·0	1·5	4·87	3·37	2·65	2·0	1·5	6·0	4·17	2·9
Diam. Suction & Delivery ins.	5	6	3½	4	5	6	7	3½	4	5
〃 Steam Inlet .. .. 〃	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
〃 Exhaust Outlet .. 〃	1¾	1¾	1¾	1¾	1¾	1¾	1¾	2	2	2
Price .. .. £	55	65	50	55	60	70	85	55	60	65

Diam. Steam Cyl. .. .. ins.	10	10	10	12	12	12	12	12	14	14
Diam. Water Cyl. .. .. 〃	8	9	10	6	7	8	9	10	7	8
Length Stroke .. .. .. 〃	18	24	24	18	18	18	24	24	24	24
Galls. per hour, approx. .. 〃	12800	16200	20000	7200	9800	12800	16200	20000	9800	12800
Height, lift per lb. Steam .. ft.	2·25	2·0	1·5	6·0	4·5	3·37	2·65	2·25	6·0	4·5
Diam. Suction & Delivery .. ins.	6	7	8	4	5	6	7	8	5	6
〃 Steam Inlet .. .. 〃	1½	1½	1½	2¼	2¼	2¼	2¼	2¼	2½	2½
〃 Exhaust Outlet .. 〃	2	2	2	2½	2½	2½	2½	2½	3	3
Price .. .. £	75	90	100	75	80	85	110	120	110	120

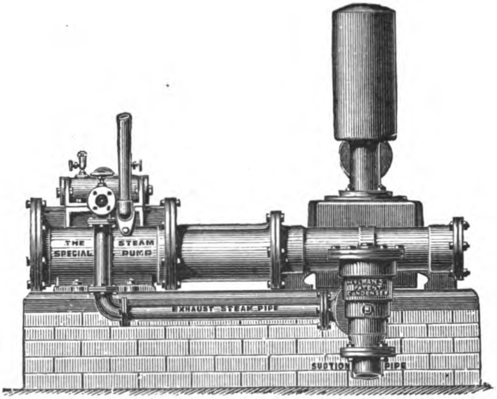
Diam. Steam Cyl. .. .. ins.	14	14	16	16	16	18	18	..	..	..
Diam. Water Cyl. .. .. 〃	9	10	8	9	10	9	10	..	..	..
Length Stroke .. .. .. 〃	24	24	24	24	24	24	24	..	..	..
Galls. per hour, approx. ..	16200	20000	12800	16200	20000	16200	20000	..	..	..
Height, lift per lb. steam .. ft.	3·67	2·95	6·0	4·5	3·25	6·0	4·87	..	..	..
Diam. Suction & Delivery .. ins.	7	8	6	7	8	7	8	..	..	..
〃 **Steam Inlet** .. .. 〃	2½	2½	3	3	3	3	3	..	..	..
〃 **Exhaust Outlet** .. 〃	3	3	3½	3½	3½	3½	3½	..	..	..
Price .. .. £	130	140	140	150	160	160	170	..	..	..

If with solid Brass Water Cylinder, with Copper Air Vessel, extra.

Brass lining to Pump Barrel, extra, see page 66.

THE "SPECIAL" STEAM PUMP

WITH HOLMAN'S PATENT CONDENSER.



The Condenser forms part of the suction-pipe, and effectually condenses the exhaust steam. The combination of a "Holman" Condenser with a "Special" Steam Pump furnishes a very convenient arrangement for use in mine workings and other places where it is difficult to dispose of exhaust steam.

The illustration shows the mode of attachment generally adopted. In cases where, because of height of lift, the quantity of water is not sufficient to condense all the steam, arrangements can be made for carrying off a portion of the latter into the sump or well.

For particulars of Holman's Condenser see page 59.

THE "SPECIAL" STEAM PUMP

WITH HOLMAN'S PATENT CONDENSER

Suitable for lifts up to 240 feet.

Diam. Steam Cyl. ins.	3	4	4	5	5	5	6	6	6	7
Diam. Water Cyl. "	3	3	4	3	4	5	4	5	6	4
Length Stroke ... "	9	9	9	12	12	12	12	12	12	12
Galls. per hour, approx.	1800	1800	3200	1800	3200	5000	3200	5000	7200	3200
Diam Suc'n. & Del'y. ins	2½	2½	2½	2½	3	3½	3	3½	4	3
" Steam Inlet "	½	¾	¾	¾	¾	¾	1	1	1	1¼
Price ... ... £	**25**	**28**	**35**	**30**	**38**	**45**	**42**	**50**	**55**	**47**

Diam. Steam Cyl. ins.	7	7	7	8	8	8	8	9	9	9
Diam. Water Cyl. "	5	6	7	5	6	7	8	5	6	7
Length Stroke ... "	12	12	12	12	12	12	18	12	12	12
Galls. per hour, approx.	5000	7200	9800	5000	7200	9800	12800	5000	7200	9800
Diam Suc'n. & Del'y. ins	3½	4	5	3½	4	5	6	3½	4	5
" Steam Inlet "	1¼	1¼	1¼	1½	1½	1½	1½	1½	1½	1½
Price ... ... £	**55**	**61**	**72**	**60**	**65**	**78**	**89**	**65**	**70**	**83**

Diam. Steam Cyl. ins.	9	9	10	10	10	10	10	12	12	12
Diam. Water Cyl. "	8	9	6	7	8	9	10	7	8	9
Length Stroke ... "	18	24	12	12	18	24	24	18	18	24
Galls. per hour, approx.	12800	16200	7200	9800	12800	16200	20000	9800	12800	16200
Diam Suc'n. & Del'y. ins	6	7	4	5	6	7	8	5	6	7
" Steam Inlet "	1½	1½	1½	1½	1½	1½	1½	2¼	2¼	2¼
Price ... ... £	**94**	**120**	**76**	**89**	**99**	**125**	**135**	**107**	**112**	**148**

Diam. Steam Cyl. ins.	12	12	14	14	14	14	14	16	16	16
Diam. Water Cyl. "	10	12	8	9	10	12	14	8	9	10
Length Stroke ... "	24	24	24	24	24	24	24	24	24	24
Galls. per hour, approx.	20000	28800	12800	16200	20000	28800	39200	12800	16200	20000
Diam Suc'n. & Del'y. ins	8	9	6	7	8	9	10	6	7	8
" Steam Inlet "	2¼	2¼	2½	2½	2½	2½	2½	3	3	3
Price ... ... £	**158**	**190**	**147**	**170**	**180**	**215**	**235**	**168**	**190**	**200**

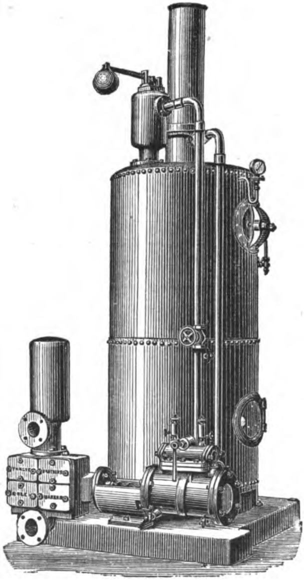
Diam. Steam Cyl. ins.	16	16	18	18	18	18	21	21	...	...
Diam. Water Cyl. "	12	14	9	10	12	14	12	14	...	...
Length Stroke ... "	24	24	24	24	24	24	36	36	...	...
Galls. per hour, approx.	28800	39200	16200	20000	28800	39200	28800	39200	...	...
Diam Suc'n. & Dely. ins.	9	10	7	8	9	10	9	10	...	...
" Steam Inlet "	3	3	3	3	3	3	3½	3½	...	...
Price ... ... £	**225**	**245**	**200**	**210**	**235**	**255**	**305**	**320**	...	...

These Prices hold for either Horizontal or Vertical Steam Pumps, see pages 48 and 50 respectively.

For particulars of Holman's Patent Condenser, see page 59.

THE "SPECIAL" STEAM PUMP

WITH VERTICAL BOILER.



This arrangement can be mounted on wheels at an extra price.

For particulars of Vertical Boiler, see page 40.

THE "SPECIAL" STEAM PUMP

WITH VERTICAL BOILER.

Diam. Steam Cyl. ins.	4	4	4	5	5	5	5	6	6
Diam. Water Cyl. "	2	3	4	2½	3	4	5	3	4
Length Stroke ... "	9	9	9	12	12	12	12	12	12
Galls. per hour, approx.	800	1800	3200	1250	1800	3200	5000	1800	3200
Price ... ... £	52	54	59	62	64	69	74	75	81
Injector Feeder, extra £	6	6	6	6	6	6	6	6	6

Diam. Steam Cyl. ins.	6	6	7	7	7	7	7	8	8
Diam. Water Cyl. "	5	6	3	4	5	6	7	4	5
Length Stroke ... "	12	12	12	12	12	12	12	12	12
Galls. per hour, approx.	5000	7200	1800	3200	5000	7200	9800	3200	5000
Price ... ... £	86	91	82	87	92	97	103	98	103
Injector Feeder, extra £	6	6	6	6	6	6	6	7	7

Diam. Steam Cyl. ins.	8	8	8	9	9	9	9	9	10
Diam. Water Cyl. "	6	7	8	5	6	7	8	9	5
Length Stroke ... "	12	12	18	12	12	12	18	24	12
Galls. per hour, approx.	7200	9800	12800	5000	7200	9800	12800	16200	5000
Price ... ... £	109	114	125	111	116	121	133	148	139
Injector Feeder, extra £	7	7	7	7	7	7	7	7	8

Diam. Steam Cyl. ins.	10	10	10	10	10	12	12	12	12
Diam. Water Cyl. "	6	7	8	9	10	6	7	8	9
Length Stroke ... "	12	12	18	24	24	18	18	18	24
Galls. per hour, approx.	7200	9800	12800	16200	20000	7200	9800	12800	16200
Price ... ... £	144	150	160	176	186	178	183	188	213
Injector Feeder, extra £	8	8	8	8	8	9	9	9	9

Diam. Steam Cyl. ins.	12	12	14	14	14	14	14	14	...
Diam. Water Cyl. "	10	12	7	8	9	10	12	14	...
Length Stroke ... "	24	24	24	24	24	24	24	24	...
Galls. per hour, approx.	20000	28800	9800	12800	16200	20000	28800	39200	...
Price ... ... £	223	243	225	235	245	255	275	295	...
Injector Feeder, extra £	9	9	9	9	9	9	9	9	...

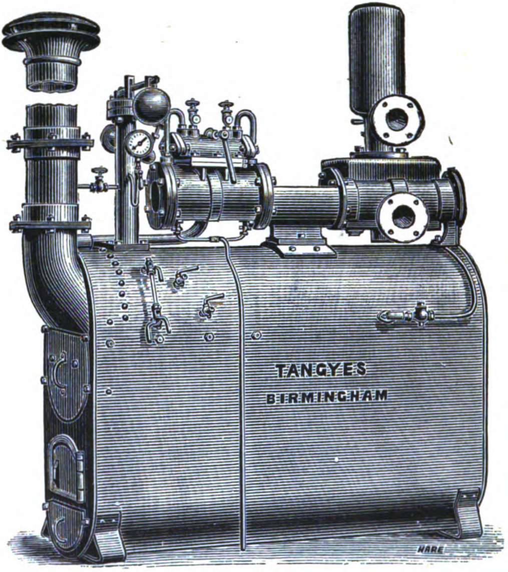
If with solid Brass Water Cylinder with Copper Air Vessel, extra.

For "Special" Steam Pumps, see page 49.
For Vertical Boilers, see page 40.
Brass-lining to Pump Barrel, extra, see page 66.

These Boilers can be fitted with Vertical Ram Feeders at an extra price, see page 76

THE "SPECIAL" STEAM PUMP

WITH "COLONIAL" TUBULAR BOILER.



This arrangement can be mounted on wheels at an extra price.

The Spark Catcher shown in illustration is not included in price, nor supplied unless specially ordered.

For particulars of "Special" Steam Pump, see page 49.
" *"Colonial" Tubular Boiler,* " 41.

THE "SPECIAL" STEAM PUMP

WITH "COLONIAL" TUBULAR BOILER.

Nominal H.P. of Boiler... ...	4	4	4	4	4	4	4
Diam. Steam Cyl. ... ... ins.	5	5	5	5	6	6	6
Diam. Water Cyl. ... ... "	2½	3	4	5	3	4	5
Length Stroke ... ... "	12	12	12	12	12	12	12
Price "Special" & Boiler with Feed Pump ... ... £	77	78	84	90	85	91	97
Galls. per hour, approx.	1250	1800	3200	5000	1800	3200	5000
Diam. Suction & Delivery, ins.	2	2½	3	3½	2½	3	3½
Length & Width of Boiler ... "	60 × 24	60 × 24	60 × 24	60 × 24	60 × 24	60 × 24	60 × 24
Heating Surface of do., sq.ft.	48	48	48	48	48	48	48

Nominal H.P. of Boiler... ...	4	6	6	6	6	6	6
Diam. Steam Cyl. ... ... ins.	6	7	7	7	7	8	8
Diam. Water Cyl. ... ... "	6	4	5	6	7	4	5
Length Stroke ... ... "	12	12	12	12	12	12	12
Price "Special" & Boiler with Feed Pump ... ... £	103	101	107	113	119	107	113
Galls. per hour, approx.	7200	3200	5000	7200	9800	3200	5000
Diam. Suction & Delivery, ins.	4	3	3½	4	5	3	3½
Length & Width of Boiler ... "	60 × 24	66 × 27	66 × 27	66 × 27	66 × 27	66 × 27	66 × 27
Heating Surface of do., sq.ft.	48	66	66	66	66	66	66

Nominal H.P. of Boiler... ...	6	6	8	8	8	8	8
Diam. Steam Cyl. ... ... ins.	8	8	9	9	9	10	10
Diam. Water Cyl. ... ... "	6	7	5	6	7	5	6
Length Stroke ... ... "	12	12	12	12	12	12	12
Price "Special" & Boiler with Feed Pump ... ... £	119	125	134	140	146	140	146
Galls. per hour, approx.	7200	9800	5000	7200	9800	5000	7200
Diam. Suction & Delivery, ins.	4	5	3½	4	5	3½	4
Length & Width of Boiler ... "	66 × 27	66 × 27	90 × 30	90 × 30	90 × 30	90 × 30	90 × 30
Heating Surface of do., sq. ft.	66	66	114	114	114	114	114

If with solid Brass Water Cylinder with Copper Air Vessel, extra.

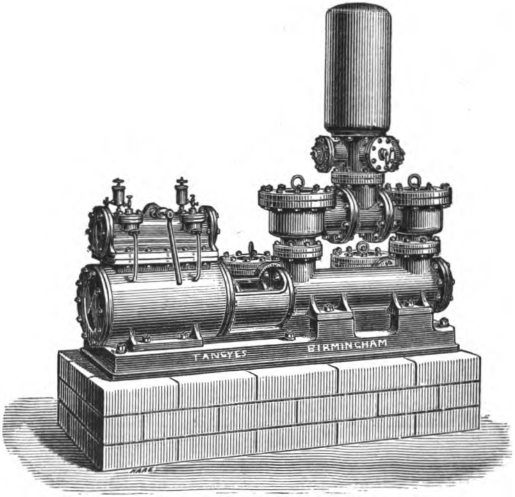
Brass Lining to Pump Barrel, extra, see page 66.

THE

"SPECIAL" MILL FIRE ENGINE

Cameron & Floyd's Patents.

TANGYES LIMITED, SOLE MAKERS.



The Engine is usually fixed in the centre of the premises, out of the reach of fire.

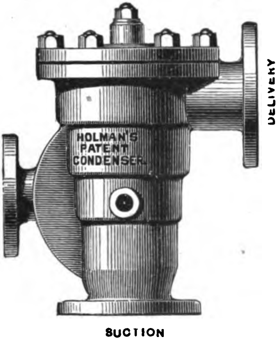
It is specially arranged for high speed, and may be worked at from 20 to 300 feet piston speed per minute.

Diam. Steam Cylinder	ins.	14	16	18
" **Water** " ...	"	6	7	8
Length Stroke	"	24	24	36
Gallons per Minute ...	...	325	450	640
Diam. Steam Inlet.. ...	ins.	2½	3	3
" Exhaust Outlet ...	"	3	3½	3½
Price	£	160	200	260

HOLMAN'S PATENT

EXHAUST STEAM CONDENSER

For Use with Steam Pumps.



This Condenser forms part of the suction pipe, and effectually condenses the exhaust steam. The mode of attaching to the "Special" Steam Pump is shown on page 52, an arrangement generally applicable, but modification can readily be made. By means of a Blow-through Valve the exhaust steam may be carried into either the Condenser or the atmosphere. In cases where, because of height of lift, the quantity of water is not sufficient to condense all the steam, arrangements can be made for carrying a portion of the latter into the sump or well. When, however, the area of the Steam Cylinder exceeds that of the Pump by more than the proportion of three to one, in the smaller sizes, the Air Pump Condenser shown at page 36 is recommended instead of above.

No.	For Pumps not exceeding		Diam. of Suction and Delivery Branches	Price
1	3 in. Steam Cyl.	2 in. Pump	1 in. or 1¼ ins.	£4
2	5 " "	3 " "	1½ " " 2 "	6
3	8 " "	4 " "	2, 2½ " " 3 "	8
4	12 " "	6 " "	3, 3½ " " 4 "	11
6	21 " "	8 " "	3½, 4, 5 " " 6 "	18
8	26 " "	10 " "	5, 6, 7 " " 8 "	30

Pipe Connections, extra.

HOLMAN'S BLOW-THROUGH VALVES

Size ins	1	1¼	1½	1¾	2	2½	3	3½	4	5	6
Price	21/-	25/-	32/-	40/-	50/-	90/-	100/-	110/-	120/-	140/-	277/-

NOTE.—Sizes 1 to 2 in. are of Gun-metal, 2½ to 6 in. of Cast-iron.

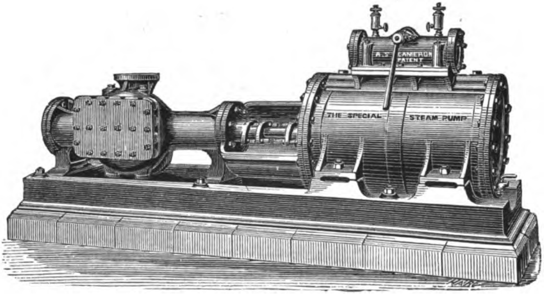
In ordering, state diameter Cylinder and Pump, height Suction and Delivery, pressure of Steam, Piston speed, and give description of the Steam Pump.

THE "SPECIAL" STEAM PUMP

Cameron & Floyd's Patents.

TANGYES LIMITED, SOLE MAKERS.

For lifts up to 540 feet.



This arrangement, known as the "Spherical Valve-box type," is specially suited for Collieries and Mines, a section of the Pump Valve is shewn at page 68.

Numbers of these Pumps are working under heads of 500 ft. in the Coal Mines of Great Britain and the Continent.

In cases where it is necessary to dispose of Exhaust Steam without conveying it through pipes, the Horizontal Air Pump Condenser, described at page 36, and shewn in combination with this Pump at page 62, is recommended, and forms a highly economical arrangement.

The "Special" Steam Pump can be worked bv Compressed Air.

THE "SPECIAL" STEAM PUMP

For lifts up to 540 feet.

Diam. Steam Cylinder .. .. ins.	7	8	9	9	10	12	12	14	14	16
" Water Cylinder .. .. "	3	3	3	4	4	4	5	5	6	5
Length Stroke .. .. "	24	24	24	24	24	24	24	24	24	24
Galls. per hour, approx.	1800	1800	1800	3200	3200	3200	5000	5000	7200	5000
Lift in ft. per lb. steam pressure ..	8·1	10·6	13·5	7·5	9·4	13·5	8·6	11·7	8·2	15·3
Diam. Suction and Delivery .. ins.	3½	3½	3½	3½	3½	3½	3½	3½	4	3½
" Steam Inlet .. .. .. "	1¼	1½	1½	1½	1½	2¼	2¼	2½	2½	3
" Exhaust Outlet .. .. "	1½	1¾	1¾	1¾	2	2½	2½	3	3	3½
Price .. .. £	**40**	**50**	**55**	**60**	**65**	**90**	**95**	**110**	**120**	**130**

Diam. Steam Cylinder .. .. ins	16	16	18	18	18	21	21	21	21	24
" Water Cylinder .. .. "	6	7	6	7	8	7	8	9	10	8
Length Stroke .. .. "	24	24	24	24	24	36	36	36	36	48
Galls. per hour, approx.	7200	9800	7200	9800	12800	9800	12800	16200	20000	12800
Lift in ft. per lb. steam pressure..	10·6	7·8	13·5	10	7·5	13·5	10·3	8·1	6·6	13·5
Diam. Suction and Delivery .. ins.	4	5	4	5	6	5	6	7	8	6
" Steam Inlet .. .. .. "	3	3	3	3	3	3½	3½	3½	3½	4
" Exhaust Outlet .. .. "	3½	3½	3½	3½	3½	4	4	4	4	5
Price .. .. £	**140**	**150**	**160**	**170**	**180**	**215**	**225**	**235**	**245**	**275**

Diam. Steam Cylinder .. .. ins.	24	24	26	26	26	30	30	30	32	32
" Water Cylinder .. .. "	9	10	9	10	12	10	12	14	12	14
Length Stroke .. .. "	48	48	48	48	48	48	48	48	72	72
Galls. per hour, approx.	16200	20000	16200	20000	28800	20000	28800	39200	28800	39200
Lift in feet per lb. steam pressure..	10·65	8·6	12·5	10·1	7	13·5	9·4	6·85	10·6	7·8
Diam. Suction and Delivery .. ins.	7	8	7	8	9	8	9	10	9	10
" Steam Inlet .. .. .. "	4	4	4	4	4	5½	5½	5½	5½	5½
" Exhaust Outlet .. .. "	5	5	5	5	5	6½	6½	6½	6½	6½
Price .. .. £	**285**	**295**	**320**	**330**	**340**	**390**	**410**	**450**	...	...

Brass Lining to Pump Barrel, extra, see page 66.

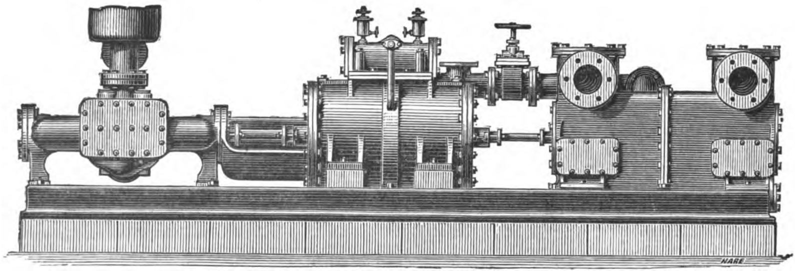
Note.—Pumps with 12 *in. Steam Cylinders, and above, have strong base-plates, as shewn. These are unnecessary with smaller sizes.*

For prices and particulars of pumps for lower lifts, see pages 49 *and* 51.

THE "SPECIAL" CONDENSING STEAM PUMPING ENGINE

Cameron & Floyd's Patents.

TANGYES LIMITED, SOLE MAKERS.



The illustration shows a "Special" Steam Pumping Engine with Horizontal Air-Pump Condenser attached. This combination is well adapted for use in Collieries and Mines, as not only is the steam effectually condensed, but a steady vacuum, equal to about 13½ lbs. per square inch on the piston, is obtained.

The Condenser is of simple construction, and is fitted with doors for ready access to the valves: the Air-Pump, Barrel, Bucket, Valve Seats, Guards, and Injection Spray-pipe, are of Gun-metal.

For Horizontal Air-Pump Condenser, see page 36.

The Condenser can be attached to any Pump having Steam Cylinder over 7 inches in diameter.

THE "SPECIAL"

CONDENSING STEAM PUMPING ENGINE

Diam. Steam Cyl. ins.	8	8	8	8	9	9	9	9	9	10	10	10	10	10
″ Water Cyl. ″	3	4	5	6	3½	4	5	6	7	4	5	6	7	8
″ Air Pump ″	4	4	4	4	4½	4½	4½	4½	4½	5	5	5	5	5
Length Stroke .. ″	18	18	18	18	18	18	18	18	18	24	24	24	24	24
Galls. per hour	1800	3200	5000	7200	2400	3200	5000	7200	9800	3200	5000	7200	9800	1280
Height in ft. with 40 lbs. steam ..	540	312	200	138	540	395	253	175	129	487	312	216	159	121
Diam. Steam Inlet ins.	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
″ Suction and Delivery .. .. ″	3½	3½	3½	4	3½	3½	3½	4	5	3½	3½	4	5	6

Diam. Steam Cyl. ins.	12	12	12	12	12	12	14	14	14	14	14	14	16	16
″ Water Cyl. ″	4½	5	6	7	8	9	5	6	7	8	9	10	6	7
″ Air Pump ″	5½	5½	5½	5½	5½	5½	6½	6½	6½	6½	6½	6½	7½	7½
Length Stroke .. ″	24	24	24	24	24	24	24	24	24	24	24	24	36	36
Galls. per hour	4000	5000	7200	9800	12800	16200	5000	7200	9800	12800	16200	20000	7200	9800
Height in ft. with 40 lbs. steam	540	449	312	229	175	138	540	425	312	238	188	153	540	407
Diam. Steam Inlet ins.	2¼	2¼	2¼	2¼	2¼	.2¼	2½	2½	2½	2½	2½	2½	3	3
″ Suction and Delivery .. .. ″	3½	3½	4	5	6	7	3½	4	5	6	7	8	4	5

Diam. Steam Cyl. ins.	16	16	16	16	18	18	18	18	18	21	21	21	21	21
″ Water Cyl. ″	8	9	10	12	7	8	9	10	12	8	9	10	12	14
″ Air Pump ″	7½	7½	7½	7½	8½	8½	8½	8½	8½	10	10	10	10	10
Length Stroke .. ″	36	36	36	36	36	36	36	36	36	48	48	48	48	48
Galls. per hour	12800	16200	20000	28800	9800	12800	16200	20000	28800	12800	16200	20000	28800	39200
Height in ft. with 40 lbs. steam.. ..	312	246	200	138	515	395	312	252	175	540	424	344	239	175
Diam. Steam Inlet ins.	3	3	3	3	3	3	3	3	3	3½	3½	3½	3½	3½
″ Suction and Delivery .. .. ″	6	7	8	9	5	6	7	8	9	6	7	8	9	10

Diam. Steam Cyl. ins.	24	24	24	24	26	26	26	30	30	30	32	32	..	..
″ Water Cyl. ″	9	10	12	14	10	12	14	11	12	14	12	14	..	..
″ Air Pump ″	11½	11½	11½	11½	12	12	12	14	14	14	15	15	..	..
Length Stroke .. ″	48	48	48	48	48	48	48	48	48	48	72	72	..	..
Galls. per hour	16200	20000	28800	39200	20000	28800	39200	24200	28800	39200	28800	39200	..	..
Height in ft. with 40 lbs. steam	540	449	312	229	540	366	269	540	487	358	540	407	..	..
Diam. Steam Inlet ins.	4	4	4	4	4	4	4	5½	5½	5½	5½	5½	..	..
″ Suction and Delivery .. .. ″	7	8	9	10	8	9	10	9	9	10	9	10	..	..

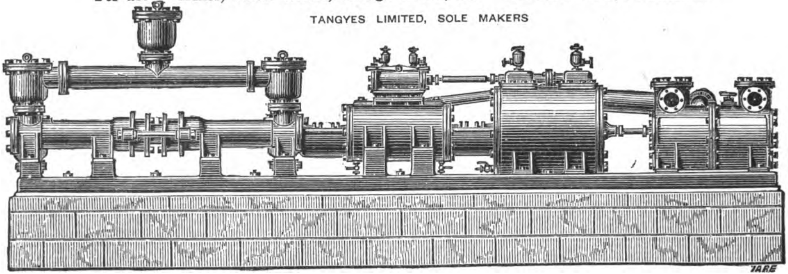
Quotations on receipt of necessary particulars.

THE "SPECIAL"

COMPOUND CONDENSING STEAM PUMPING ENGINE

For use in Mines, Water Works, Sewage Works, &c. Cameron & Floyd's Patents.

TANGYES LIMITED, SOLE MAKERS



The illustration sufficiently indicates the general arrangement of this Pumping Engine, and its applicability to Mining and Water Works purposes.

The Newcastle and Gateshead Water Co. have a number of them at work, and the report of their Engineer is given below.

Newcastle and Gateshead Water Company,
Newcastle-on-Tyne, October, 20th, 1879.

21-36 in. × 10 in. × 48 in. Compound Condensing Steam Pumping Engine.

Messrs. **Tangye Brothers.**

Gentlemen,—In reply to your inquiry as to the efficiency of the two pairs of Compound Condensing Engines recently erected by you for this Company at our Gateshead Pumping Station, I have great pleasure in informing you that they have far surpassed my expectation, being capable of pumping 50 per cent. more water than the quantity contracted for, and by a series of experiments I find they work as economically as any other Engine of the compound type, and will compare favourably with any other class of Pumping Engine. By the simplicity of their arrangement and superior workmanship, they require very little attendance and repairs, and the pumps are quite noiseless.

A short time ago I had them tried upon air by suddenly shutting off the column, and found they did not run away, thus shewing the perfect controlling or governing power of the Floyd's improved steam moved reversing valve.

I will thank you to forward the other two pairs you have in hand for our Benwell Pumping Station.

Yours faithfully,
(Signed) **John R. Forster, Engineer.**

THE "SPECIAL"

COMPOUND CONDENSING STEAM PUMPING ENGINE

GENERAL LIST

Diam. High-Pressure Cyl.		ins.	7	8	9	10	12	14	16	17¼	21	24
" Low "		"	12	14	16	18	21	24	28	30	36	42
Length Stroke		"	18	18	24	24	36	36	36	48	48	60
Diam. Pump	Ordinary Pattern for various lifts up to 240 feet	"	14	14	14	14	14	14	14	14	14	14
			12	12	12	12	12	12	12	12	12	12
			11	11	11	11	11	11	11	11	11	11
			10	10	10	10	10	10	10	10	10	
			9	9	9	9	9	9	9	9		
			8	8	8	8	8	8	8			
			7	7	7	7	7	7				
			6	6	6	6	6					
			5	5	5	5						
	Spherical Pattern for various lifts up to 540 feet		4½	4½	4½							
			4	4								
			3½									

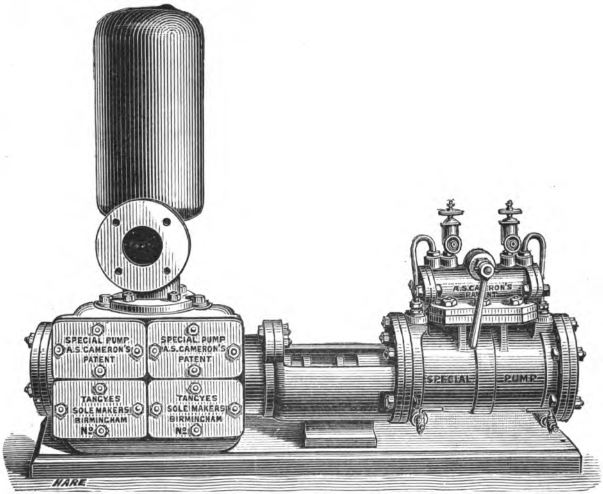
FOR LIFTS VARYING FROM 540 TO 1000 FEET.

These Pumps have outside valve boxes and may be of the double ram or bucket type.

Diam. High-Pressure Cyl.	ins.	7	8	9	10	12	14	16	17¼	21	24
" Low " "	"	12	14	16	18	21	24	28	30	36	42
Length Stroke	"	18	18	24	24	36	36	36	48	48	60
Diam. Pump	"	3½	4	4½	5	6	7	8	9	10	11
" "	"	3	3¼	4	4½	5	6	7	8	9	10
" "	"	2¾	3	3½	4	4½	5	6	7	8	9

Quotations on receipt of necessary particulars.

BRASS LININGS FOR PUMP BARRELS


SPECIAL PUMP A.S. CAMERON'S PATENT
TANGYES SOLE MAKERS BIRMINGHAM No
A.S. CAMERON'S PATENT
SPECIAL PUMP
HARE

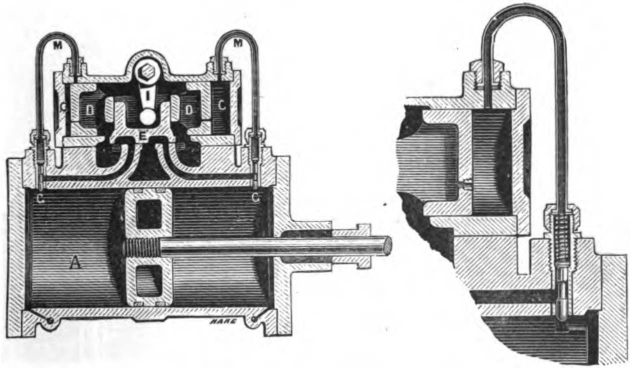
Stroke of Pump } ins.	6	9	12	18	24	36	48
	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Diam. Barrel 1¼ ins.	0 10	...	...	...	...	...	...
" " 1½ "	...	0 17	...	...	...	...	...
" " 2 "	...	1 1	...	...	...	...	...
" " 2½ "	...	1 14	2 2	...	...	...	...
" " 3 "	...	2 7	2 7	3 12	3 18	...	...
" " 4 "	..	3 0	3 2	5 6	5 12	...	...
" " 5 "	...	...	4 5	5 17	6 10	...	...
" " 6 "	...	...	5 0	7 0	8 18	11 12	...
" " 7 "	...	...	5 17	8 14	10 12	16 0	...
" " 8 "	...	...	9 1	9 11	10 17	17 0	25 0
" " 9 "	...	...	...	10 7	10 18	19 4	27 0
" " 10 "	...	...	...	13 10	12 5	25 8	30 0
" " 12 "	...	..	...	...	19 7	27 18	36 7
" " 14 "	...	...	...	...	28 12	41 6	54 11

These Prices include boring, turning, and fixing into Pump Barrel.

THE "SPECIAL" STEAM PUMP

Cameron & Floyd's Patents.

TANGYES LIMITED, SOLE MAKERS.



EXPLANATION OF THE MODE OF WORKING.

A Cylinder. **C** Valve Chest. **D** Plunger, for carrying Slide Valve. **E** Slide Valve. **F** Tappet Bush. **G** Tappet Valve. **I** Finger for Starting. **M** Steam Chest Exhaust Pipes. **N** Adjusting Plug, to compensate for wear of Plunger.

In the above illustration the *Slide Valve* is in position for admitting steam to the left hand end of Cylinder. When the *Piston*, by contact, lifts the right hand *Tappet* **G** (this end of the Cylinder being at the time in communication with the Exhaust,) steam is exhausted from the *Plunger Chamber*, **C**, through the *Pipe*, **M**, thus putting in motion the *Plunger*, **D**, and *Slide Valve*, **E**, and thereby reversing the Engine.

DIRECTIONS FOR FIXING AND STARTING.

In fixing, care must be taken to prevent any dirt from getting into the steam chest, and it is always desirable to blow steam through the pipes before connecting them. In fitting the steam pipes provision should be made for drawing off the condensed water to prevent its passing into the cylinder.

At starting, open the pet cocks and work the hand lever to and fro a few times.

If the piston should not travel its full stroke, but continue to work to and fro at one end of the cylinder, take out and clean the tappet valve (G) at the opposite end, and blow steam through, as a little grit will sometimes prevent its working at first.

Always use suet in the lubricator—it is better and more economical than either tallow or oil.

PUMP VALVES

As used in the "Special" Steam Pump

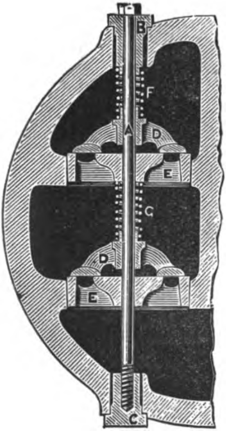


Fig. 1

DOUBLE WAY VALVE

(BRASS)

A	Spindle
B	Top Stopper
C	Bottom Stopper
D	Valve Falls
E	Seats
F	Top Spring
G	Bottom Spring

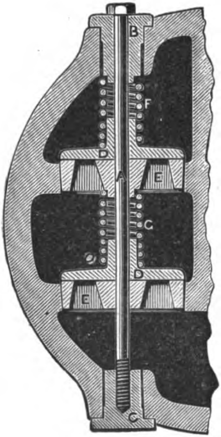


Fig. 2

SINGLE WAY VALVE

(BRASS)

A	Spindle
B	Top Stopper
C	Bottom Stopper
D	Valve Falls
E	Seats
F	Top Spring
G	Bottom Spring

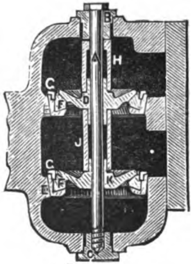


Fig. 3

HOLMAN'S VALVE

(BRASS)

A	Spindle
B	Top Stopper
C	Bottom Stopper
D	Top Valve Fall
E	Seat Holder
F	Rubber Seat
G	Screwed Ring
H	Top Buffer
J	Bottom Buffer
	(India rubber)
K	Bottom Valve Fall

In ordering give the figure and letter as a means of identification. Give also the number and size of Pump.

PUMP VALVES

As used in the "Special" Steam Pump.

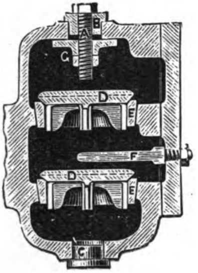


Fig. 4

WiNG VALVE
(BRASS)

A	Spindle
B	Top Stopper
C	Bottom Stopper
D	Valve Falls
E	Seats
F	Screwed Stop
G	Washer

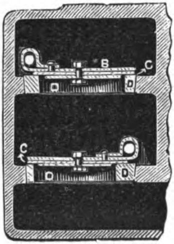


Fig. 5

SEWAGE VALVE
(WROUGHT-IRON)

A	Spindle
B	Clacks
C	Clack Leathers
D	Seats

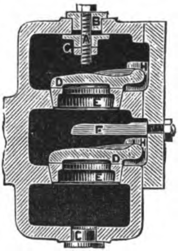


Fig. 6

CLACK VALVE

A	Spindle
B	Top Stopper
C	Bottom Stopper
D	Clacks
E	Seats
F	Screwed Stop
G	Washer
H	Hinge Pieces (2 pairs)

Note.—Clack Valve Fig. 6 *is made in four forms, viz.:*

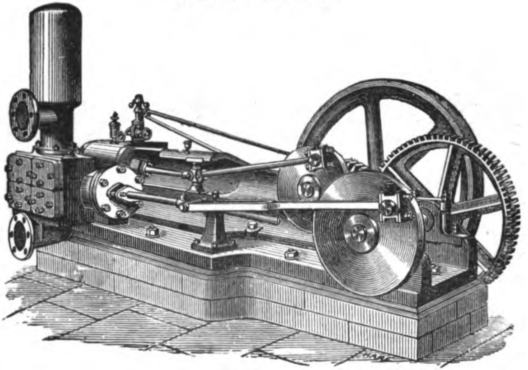
All Brass. Brass with Leather Seats.
All Iron. Iron with Leather Seats.

In ordering give the figure and letter as a means of identification. Give also the number and size of Pump.

TANGYES' GEARED

STEAM PUMPING ENGINE

With Patent Governor.



The Engine is so arranged that the entire power can be applied to the pump, or the latter can at any time be disconnected from the Engine, and the power applied to other purposes.

The Pump is now made with Slipper Guide, and not as shown in illustration.

Size of Engine	C	D	E	G	H	I	J	K
Diam. Steam Cyl. ins.	5	6	8	9	10	11¼	12	14¼
Stroke ... ... "	10	12	16	18	20	20	24	28
Stroke Pump ... "	12	12	12	18	24	24	24	24
Galls. per hour								
Diam. do. 3 ins. 1,500 £	60	...	...	...	...	...	...	...
" 4 " 3,000 £	65	72	...	...	...	...	...	...
" 5 " 4,000 £	...	75	105	...	...	...	...	...
" 6 " 6,000 £	...	80	110	130	185	200	210	...
" 7 " 8,000 £	...	...	115	135	190	205	215	...
" 8 " 11,000 £	...	...	120	145	200	215	225	...
" 9 " 13,500 £	...	...	135	160	210	225	235	...
" 10 " 16,000 £	...	...	...	...	225	240	250	320
" 12 " 24,000 £	...	...	...	...	250	265	275	380
" 14 " 32,000 £	...	...	...	...	...	...	...	405

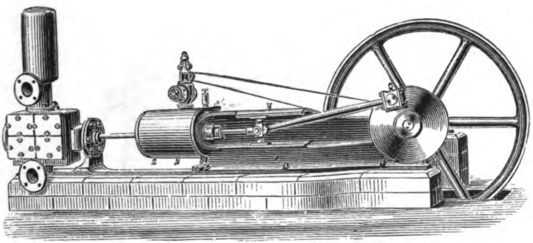
Hard wood mortice gear and pinion pitched and trimmed, extra.
Holding Down Bolts and Plates, extra.
Feed Pump, extra.

These Engines also supplied with Deep Well Pumps.

TANGYES'

STEAM PUMPING ENGINE

With Patent Governor.



The above illustration represents The "Tangye" Steam Engine, with extra large Fly-wheel, combined with Double Action Pump, worked direct behind Steam Cylinder.

Size of Engine	Galls. per hour	D	E	G	H
Diam. Steam Cyl.... ins.		6	8	9	10
Stroke... ... ... "		12	16	18	20
Stroke Pump ... "		12	16	18	20
Diam. do 3 ins.	2,000 £	63	...	...	...
" " 4 "	3,500 £	68	...	...	...
" " 5 "	5,500 £	73	98	...	...
" " 6 "	8,500 £	78	103	123	154
" " 7 "	11,500 £	...	108	128	159
" " 8 "	15,000 £	...	118	138	169
" " 9 "	19,000 £	...	128	145	179

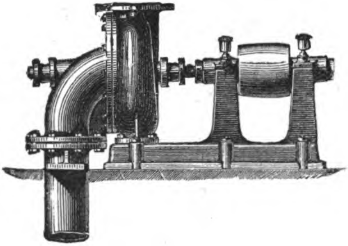
Holding Down Bolts and Plates, extra.
Feed Pump, extra.

Brass lining to Pump Barrel, extra, see page 66.
These Engines also supplied with Deep Well Pumps.

TANGYES'

CENTRIFUGAL PUMP

(Jefferiss' Improvements)



This Pump occupies less space than any previously introduced. Either the Disc or Spindle can be easily removed, without disturbing the Suction or Delivery pipes. By special construction, the pressure of the water on the Disc is equalized, so that no side thrust is communicated to the Spindle. The usual air-tight joint with the bed-plate is dispensed with, as the suction pipe is connected direct to the pump. The suction of this Pump can be made horizontal instead of vertical without extra charge.

Diam. Suction and Delivery.. ins.	2	3	4	5	6	7	8	9	10	12	15	18
Galls. per min. approx.	50	80	200	340	500	650	900	1100	1500	1800	3000	4500
Pump with 1 standard and 1 pulley ... ... £	8	9	12	17	19	26	28	31	38	62	75	115
Pump with 2 standards and 1 pulley ... ... £	9	10	14	19	21	29	31	35	43	70	82	125
Pump with 2 standards and 2 pulleys... ... £	10	11	16	21	24	32	35	39	48	75	87	135
Foot Valve & Strainer £	1 7	1 10	2	3	4	5	5 10	7	7 10	8 10	12	16

Pumps with 2 Standards and 2 Pulleys have Belt Shifting Gear.

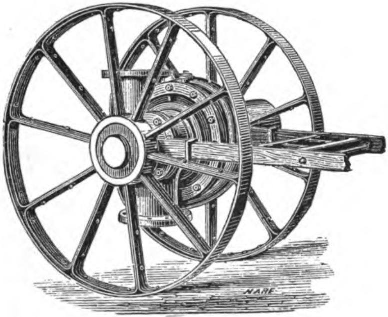
Prices of larger sizes on application.

In ordering, state height of lift and length of Suction Pipe.

TANGYES'

PORTABLE CENTRIFUGAL PUMP

(Jefferiss' Improvements)



This Pump will be found useful in countries where irrigation, or drainage of low lands, is necessary.

The Shafts, for draught by horses or bullocks, are arranged to fit into the fore-carriage of any ordinary Portable Engine without blocking.

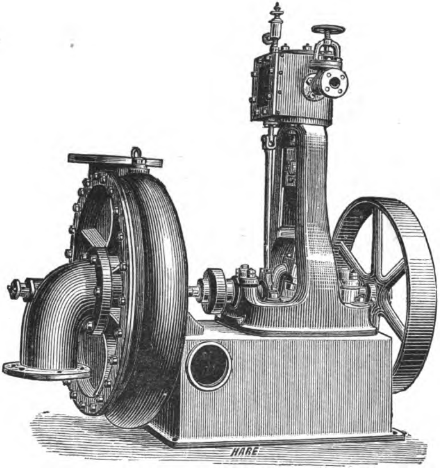
The pipes may be fixed at any angle, as the Pump swivels on the carriage.

Diam. Suction and Delivery ... ins.	**6**	**7**	**8**	**9**	**10**	**12**
Galls. per min., approx.	500	650	900	1100	1500	1800
Diam.& Width of Pulley, ins.	8×8	10×9	11×9	12×9	14×9	15¾×9½
Price ... ... £	**32**	**40**	**46**	**55**	**70**	**105**
Foot Valve and Strainer £	4	5	5 10	7	7 10	8 10

TANGYES' DIRECT-ACTING

CENTRIFUGAL PUMPING ENGINE

(Jefferiss' Improvements.)



This arrangement has been designed specially for use as a Circulating Pump for Marine Engines; also for Dockyard or Salvage purposes, Sewage and Irrigation Works. The Engine need not run at an excessive speed, as the large diameter of pump disc gives the required peripheral speed when making a moderate number of revolutions. The side of Pump and disc can be removed without disturbing any of the pipes. The Pump may be fitted with Foot Valve or Air Ejector and Flap Valve, for charging at starting.

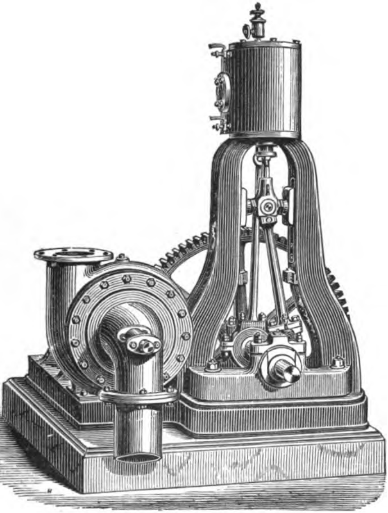
Diam. Suction & Delivery ins.	4	5	6	7	8	9	10	12
Height, level of water to level of delivery ... ... ft.	15	25	25	25	25	25	25	25
Galls. per minute	230	340	500	650	900	1100	1500	2000
Price, Engine and Pump £	**50**	**65**	**70**	**90**	**110**	**130**	**155**	**180**
Foot Valve and Strainer, extra £	2 0	3 0	4 0	5 0	5 10	7 0	7 10	8 10
Gun-metal Spindle .. " £	1 15	2 0	2 5	3 0	3 10	4 15	6 0	7 5
" Disc ... " £	4 15	7 15	10 15	12 10	14 10	20 0	25 0	30 0
Diam. Steam Inlet ... ins.	1	1¼	1½	1½	2	2	2	2½
" Exhaust Outlet ... "	1¼	1½	2	2	2½	2½	2½	3

Feed Pump, extra.
Air Ejector and Flap Valve, extra.

TANGYES' GEARED

CENTRIFUGAL PUMPING ENGINE

(Jefferiss' Improvements.)



This arrangement is a self-contained combination of our Improved Centrifugal Pump, page 72, and Vertical Steam Engine pp. 18 and 20. It can be used for either Marine, Dockyard, Irrigation or Salvage purposes. The Engine need not run at an excessive speed, as the requisite velocity of Pump disc is obtained by Gearing, consisting of a Mortice Wheel on Engine Shaft working into an Iron Pinion on Pump Spindle. The side of pump and disc can be removed without disturbing any of the pipes. The Pump may be fitted with Foot Valve or Air Injector and Flap Valve, for charging at starting.

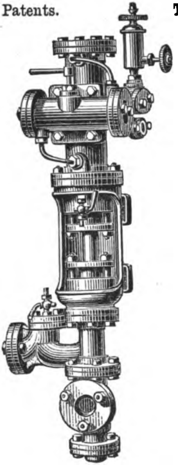
Diam. Suction & Delivery ins.	**3**	**4**	**6**	**9**	**10**	**12**
Galls. per min., approx, 30 ft. high	80	230	500	1100	1500	2000
Revs. of Engine per min. ...	325	300	200	180	150	150
Engine and Pump ... £	**42**	**55**	**75**	**110**	**150**	**190**
Foot Valve and Strainer ... £	1 10	2	4	7	7 10	8 10
Diam. Steam Inlet ... ... ins.	1	1¼	1½	2	2½	3
" Exhaust Outlet ... "	1¼	1½	2	2½	3	3½

Feed Pump, extra.
Air Ejector and Flap Valve, extra.

THE "SPECIAL"

RAM PUMP AND BOILER FEEDER

Cameron & Floyd's Patents. **Tangyes Limited, Sole Makers**



This Pump is specially suited for feeding quick-steaming Boilers.

It may be relied upon to work down to a speed of one stroke per minute, and enable the supply of feed water to be adjusted to the evaporation.

The Pump has gun-metal Ram, Valves, and Seats.

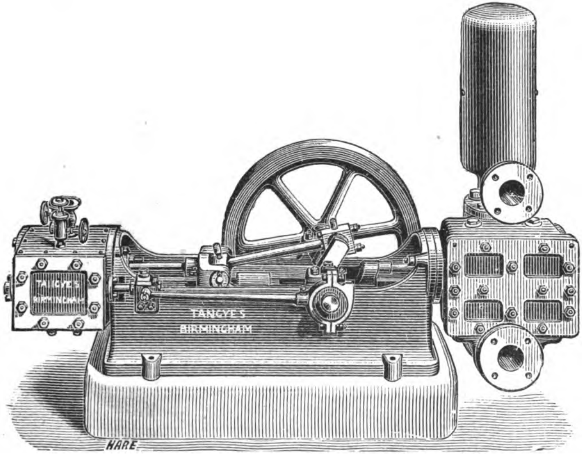
Size	No.	1	2	3	4	5
Diam. Steam Cyl.	ins.	2¼	3	4	5	6
" Ram ...	"	1⅛	1½	2	2½	3
Length Stroke ...	"	6	9	9	12	12
Gallons per hour...	..	210	360	640	1000	1440
Price	£	10 10	14	16	18 10	22
To Feed H.P. Boiler	...	14	24	40	66	96
Diam. Steam Inlet ...	ins.	½	½	¾	¾	1
" Exhaust Outlet	"	¾	¾	1	1	1¼
" Suction & Del'vry	"	¾	1	1¼	2	2½
Overall Dimensions	"	32 × 12	38 × 13	44 × 16	50 × 18	50 × 24
Weight	cwts.	¾	1	1¾	3¾	4½

If with solid Brass Water Cylinder with Copper Air Vessel, extra.

Brass lining to Pump Barrel, extra, see page 66.

TANGYES' IMPROVED

DOUBLE-ACTION FLY-WHEEL PUMP



The pump valves (double beat) are of gun-metal, have large area and small lift, working almost noiselessly when Pump is running at moderate speed.

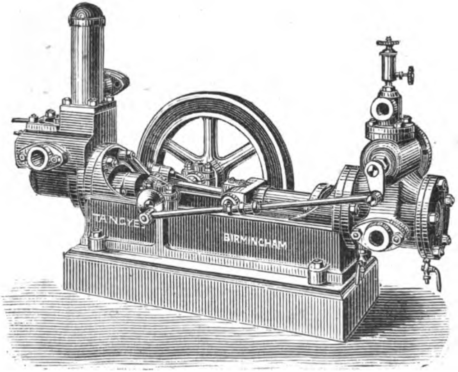
Barrel lined with Brass.
Wrought-iron Connecting Rod and Bow Crank.
A turned Fly-wheel on each end of Shaft.

Size ... ... No.	30	31	32
Diam. Steam Cyl. ... ins.	6½	6½	6½
Diam. Water Cyl. ... "	3½	4	4½
Length Stroke ... ... "	8	8	8
Gallons per hour	3300	4300	5500
Price ... ... £	50	52	54
Diam. Steam Inlet ... ... ins.	1½	1½	1½
" Exhaust Outlet ... "	2	2	2
" Suction Inlet ... "	4	4	4
" Delivery Outlet ... "	3½	3½	3½
Over-all dimensions	73 × 24	73 × 24	73 × 24
Weight ... ... cwts.	15	15	15

JEFFERISS' PATENT

RAM PUMP AND BOILER FEEDER

TANGYES LIMITED, SOLE MAKERS.



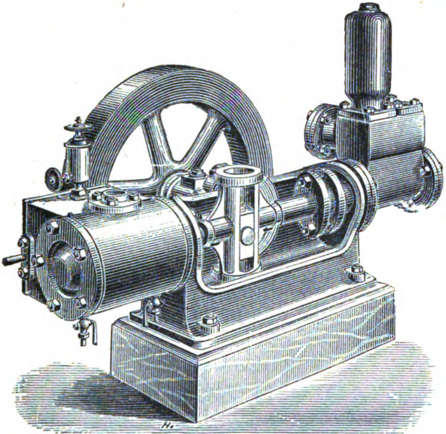
Size ... ... No.	11	12	13	14	15
Diam. Steam Cyl.... ins.	2½	3⅛	4½	4¾	5
Diam. Ram ... ... "	1½	2	2½	2¾	3
Length Stroke ... "	4	5	5	5	5
Gallons per hour ...	210	420	600	750	900
Price ... ... £	17	20	23	26	30
To feed H.P. Boiler ...	14	28	40	50	60
Diam. Steam Inlet ... ins.	⅜	½	¾	1	1
" Exhaust Outlet "	⅝	¾	1	1¼	1¼
" Suction & Del'vry "	1	1½	1¾	1¾	2
Overall dimensions "	38 × 11	45 × 15	49 × 17	50 × 18	52 × 19
Weight ... ... cwts.	2	3	4	4¼	4½

Note.—A close fitting Hinged Cover of sheet-steel, not shewn in illustration, is supplied with Nos. 13, 14, *and* 15, *protecting the wearing surface from dirt and grit.*

BARNES'

RAM PUMP AND BOILER FEEDER

TANGYES LIMITED, SOLE MAKERS.



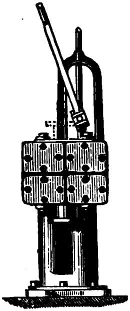
Size ... ... No.	**21**	**22**	**23**	**24**	**25**
Diam. Steam Cyl. ins.	2¼	3	4	5	6½
" **Ram** ... "	1⅛	1⅝	2¼	2½	4
Length Stroke ... "	3	4	5	6	7½
Gallons per hour ...	105	210	420	600	1280
Price ... ... £	16	19	22	27	32
To Feed H.P. Boiler ...	7	14	28	40	85
Diam. Steam Inlet ... ins.	½	¾	1	1¼	1½
" Exhaust Outlet "	¾	1	1¼	1½	2
" Suction & Del'y "	¾	1	1½	2	3
Overall Dimensions... "	31 × 11	38 × 14	46 × 17	50 × 21	58 × 26
Weight... ... ... cwts.	1¼	2¾	4½	5¾	7

Note.—Lagging the Steam Cylinder with sheet-steel, as shewn in illustration, is an extra, and not included in list price.

HOLMAN'S

DOUBLE-ACTION VERTICAL PUMP

This Pump is usually fitted with Holman's Valves. The Valve Boxes, however, are arranged to take Valves of other types if desired.



Diam. Pump	Length Stroke	Gallons per hour	Price Pump	Sling, Guide, and Standard extra.
3 ins.	12 ins.	1,450	£10 0	£1 5
4 "	12 "	2,550	14 0	1 10
4½ "	12 "	3,250	15 10	1 15
5 "	12 "	4,000	17 10	1 15
6 "	12 "	5,750	22 0	3 0
6 "	18 "	5,750	26 0	3 15
8 "	18 "	10,250	35 0	5 0
9 "	18 "	13,000	43 0	6 5
10 "	18 "	16,000	60 0	9 0

In ordering, state whether Pump is required with Sling Guide, &c., as shown in illustration, or not.

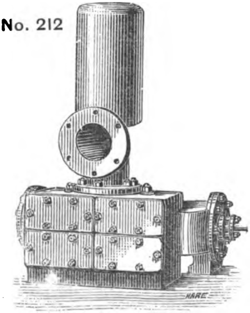
Brass Lining to Pump Barrel extra, see page 66.

HOLMAN'S

DOUBLE-ACTION HORIZONTAL PUMP

This Pump is usually fitted with Holman's Valves. The Valve Boxes, however, are arranged to take Valves of other types if desired.

No. 212



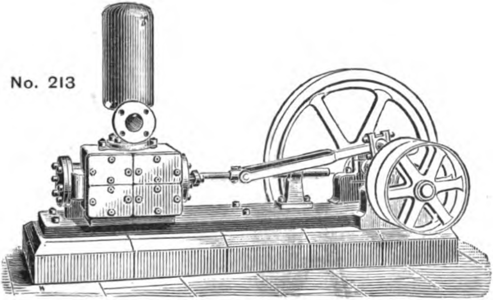
Diam. Pump	Length Stroke	Gallons per hour	Price
3 ins.	12 ins.	1,350	£10 0
4 "	12 "	2,500	14 0
5 "	12 "	3,300	17 10
6 "	12 "	5,800	22 0
7 "	12 "	7,500	25 0
8 "	18 "	10,200	35 0
9 "	18 "	13,200	43 0
10 "	18 "	16,000	60 0
12 "	24 "	23,000	85 0
14 "	24 "	31,300	105 0

Brass Lining to Pump Barrel extra, see page 66.

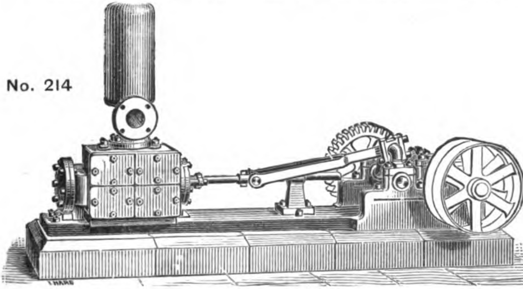
HOLMAN'S

DOUBLE-ACTION HORIZONTAL PUMPS

No. 213



No. 214



The price includes Pump and Air Vessel on cast-iron base, wrought-iron crank shaft, plummer blocks and brasses, gun-metal strap head, connecting rod, sling and guide.

The Pulleys are not included in price, size depending on speed of the first motion shaft.

The Fly-wheel shown in Fig. 213 is not included in price.

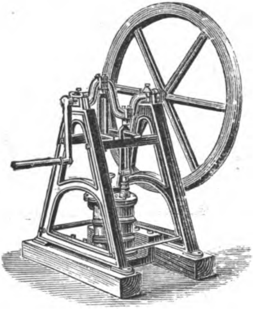
Diam. Pump Barrel ins.	3	4	5	6	7	8	9	10	12
Length Stroke ... ... "	12	12	12	12	12	18	18	18	24
Galls per hour, 80 ft. per min	1450	2550	4000	5800	7850	10250	12600	16000	23000
Price, No. **213** minus fly-wheel and pulleys £	18	25	28	35	40	50	65	75	100
Do. No. **214** minus pulleys £	21	28	35	45	55	65	80	90	120

Brass Lining to Pump Barrel extra, see page 66.

TANGYES'

LIFT AND FORCE PUMP

In Triangular Frame.



The Frame is supplied with either Single or Double Brass Barrel Pump, and is fitted with wrought-iron crank, sling and guide, fly-wheel and handle. The Pump can, if desired, be disconnected from the frame, for fixing in Wells exceeding 28 feet deep, and can then be worked with the same handle and gear.

Diam. of Barrels	With Single Barrel Pump	With Double Barrel Pump	Second Winch Handle, extra
2½ ins.	£15 10 0	£20 0 0	15/-
3 "	16 10 0	22 0 0	15/-
3½ "	17 10 0	24 10 0	15/-

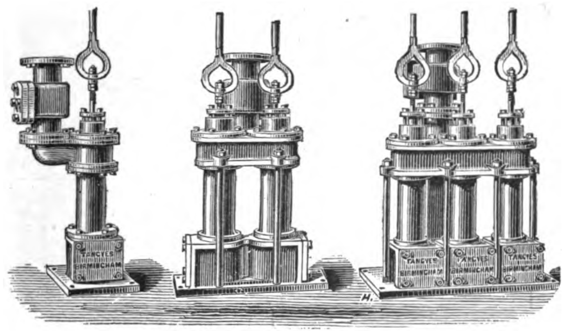
Pulleys for power, extra.

For Suction and Delivery Hose, see page 267.
For Wrought-iron Tubes, see page 272.

TANGYES'

IMPROVED DEEP WELL PUMP

Extra Strong.



These Pumps are of a superior description to those usually offered. The Barrels are made in Iron or Brass.

Diam. of Barrels	SINGLE		DOUBLE		TREBLE	
	Iron	Brass	Iron	Brass	Iron	Brass
2 ins.	...	4 5 0	...	11 0 0	...	17 0 0
2½ "	...	4 10 0	...	11 11 0	...	17 17 0
3 "	5 0 0	5 15 0	11 10 0	13 13 0	18 0 0	19 19 0
3½ "	5 15 0	6 10 0	13 10 0	15 15 0	22 0 0	23 10 0
4 "	7 10 0	8 10 0	14 10 0	18 18 0	26 0 0	31 10 0
4½ "	10 15 0	11 15 0	18 0 0	25 10 0	30 10 0	39 10 0
5 "	14 0 0	15 0 0	21 10 0	32 0 0	35 0 0	47 10 0
5½ "	15 15 0	18 0 0	25 15 0	37 0 0	41 10 0	56 5 0
6 "	17 10 0	21 0 0	30 0 0	42 0 0	48 0 0	65 0 0

The "Tangye" Steam Engine, with Vertical Boiler, mounted on cast-iron base and worked by means of Spur Wheel and Pinion, forms with the above Pump a very useful combination.

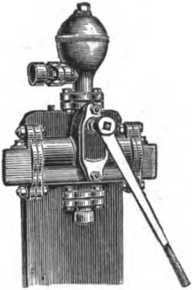
Estimates given on receipt of following particulars :—

Depth of Well from surface.
Quantity of Water required per hour.
Height and distance Water is to be forced from mouth of Well.

HOLMAN'S

DOUBLE-ACTION "LONDON" PUMP

On Plank.



The working parts in this Pump are few, simple, and easily accessible.

The inlet and outlet are screwed for wrought-iron pipe, but can be provided with brass nozzle for lead pipe if desired.

The Pump is well suited for export, and for farm and garden purposes.

If this Pump is required for ammoniacal liquor, or for hot water, an extra price is charged.

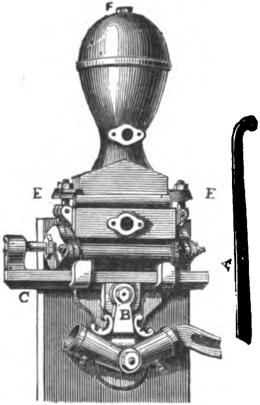
Delivery Outlet is in front not at side as illustrated.

Diam. of Pump	Galls. per hour	Price
2½ ins.	250	£3 0
3 "	390	3 10
4 "	700	4 10
5 "	850	6 0
6 "	1000	7 10

TANGYES' "CALIFORNIA"

DOUBLE-ACTION FORCE PUMP

On Plank.



The valves in this Pump can be got at without the removal of a bolt or nut.

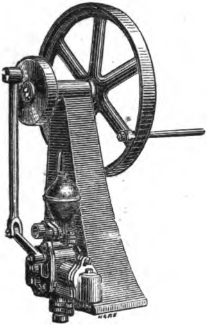
The 5-in. Pump has 2 handles. Extra handle for other sizes 5/- each.

Diam. of Pump	Length Stroke	Double Stroke	Galls. per hour	Price
2½ ins.	5 ins.	35 per min.	250	£4 8
3 "	5 "	35 "	450	5 10
4 "	5 "	35 "	825	7 0
5 "	5 "	35 "	1300	8 15

For Prices of Hose, Branch Pipes, Unions, &c., see page 267.

HOLMAN'S "LONDON"

DOUBLE-ACTION PILLAR PUMP



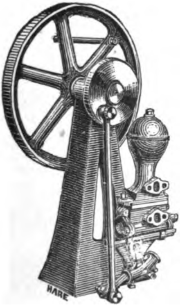
This arrangement consists of the "London" Pump attached to a cast-iron pillar with Crank Plate, Fly-wheel, and Handle. It is made to work by hand, but, for a small extra, the pulley may be had turned for a driving belt.

If this Pump is required for ammoniacal liquor, or for hot water, an extra price is charged.

Diam. Pump	Gallons per hour	Price
2½ ins.	250	£7 5
3 "	390	8 5
4 "	700	10 0
5 "	850	14 0

TANGYES' "CALIFORNIA"

DOUBLE-ACTION PILLAR PUMP



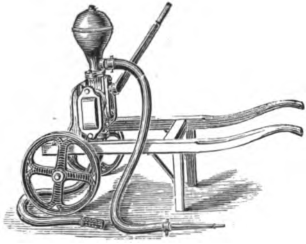
This arrangement consists of the "California" Pump attached to a cast-iron pillar with Crank Plate, Fly-wheel, and Handle. It is made to work by hand, but, for a small extra, the pulley may be had turned for a driving belt.

Diam. Pump	Gallons per hour	Price
2½ ins.	250	£9 0
3 "	450	10 10
4 "	825	12 5
5 "	1300	16 15

For Prices of Hose, Branch Pipes, Unions, &c., see page 267.

HOLMAN'S

"LONDON" PUMP ON BARROW



This arrangement consists of the "London" Pump, shown on page 84, mounted on Barrow. It makes a useful fire engine, and will discharge a good supply of water through hose pipe to a height of 40 or 50 ft.

Each Pump is supplied with Half Union on suction and delivery, but no Hose.

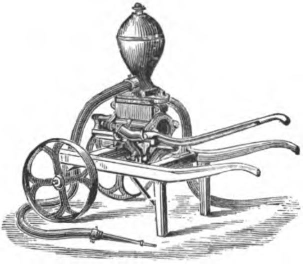
If this Pump is required for ammoniacal liquor, or for hot water, an extra price is charged.

The Pump is fitted to Barrow as illustrated.

Diam. Pump ... ins.	2½	3	4	5	6
Price ... ... £	5 0	5 10	6 10	8 0	9 10

TANGYES' "CALIFORNIA"

DOUBLE-ACTION FORCE PUMP ON BARROW



This arrangement consists of the "California" Pump, shown on page 84, mounted on Barrow.

Diam. of Pump	**Price**
2½ ins.	£6 10
3 "	7 10
4 "	9 0
5 "	10 15

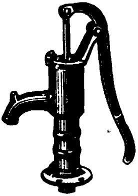
Each Pump is supplied with Half Union on suction and delivery, but no Hose.

The 5-inch Pump has two Handles. Extra Handle for other sizes 5/- each.

For Prices of Hose, Branch Pipes, Unions, &c., see page 267.

TANGYES' "CORNISH" LIFT PUMP

No. 234.



Has improved clack valves, which are readily accessible without disturbing the pipe. It is fitted for either lead or wrought-iron pipe.

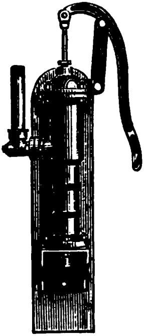
The Pump is now made with square base-plate and solid flange on bottom—not as shown in illustration.

The handle may be set at any angle with the spout.

Diameter of Barrel	Price without Plank as shown	Price on Plank	Gallons per hour
2½ ins.	17/-	25/-	180
3 "	24/-	32/-	260
3½ "	30/6	38/6	370

TANGYES' "CORNISH" LIFT AND FORCE PUMP

No. 235.



Suitable for forcing water into tanks, for extinguishing fires, washing, and many other purposes.

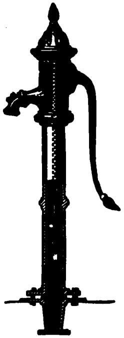
The handle may be set at any angle with the spout, and the latter may be set either right, left, or in front. Spout has also screwed nozzle and brass cap.

Diameter of Barrel	Price without Plank	Price on Plank as shown	Gallons per hour
2½ ins.	30/-	38/-	180
3 "	39/-	47/-	260
3½ "	50/-	58/-	370

For Prices of Hose, Branch Pipes, Unions, &c., see page 267.

CAST-IRON PUMP

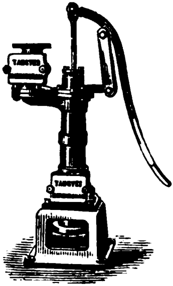
With Bored Barrel and Brass Valves and Bucket.



This Pump is adapted for wells, tanks, ponds, &c., not exceeding 28 feet deep, and may be placed immediately over the well, or at a distance away in any convenient situation. The handle can be placed either right or left hand or back of spout as desired.

Diam. Pump	Price	Length below spout
2½ ins.	38/-	3 ft. 0 ins.
3 "	45/-	3 " 0 "
3½ "	48/-	3 " 0 "
4 "	55/-	3 " 0 "
4 "	67/-	6 " 6 "
4½ "	68/-	3 " 0 "
5 "	85/-	3 " 0 "
6 "	115/-	3 " 0 "

CAST-IRON LIFT PUMP



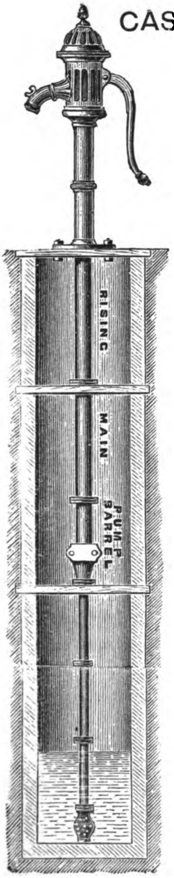
This Pump is mounted on a cast-iron base suitable for fixing over wells or tanks. It has iron valves and seats, with valve doors, and is suited for pumping Tar, Ammoniacal Liquors, &c.

The handle can be placed at any angle with outlet.

Price for Pump as shown, with 3½ inch barrel, £8

CAST-IRON DEEP WELL PUMP

With detached Barrel.



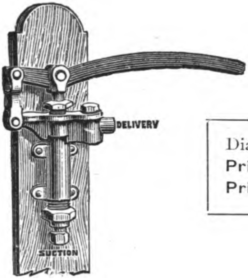
This Pump is suitable for Wells up to 80 feet deep, having detached barrel for placing within 15 to 20 feet of water. The Rising Main is sufficiently large to allow the bucket to be drawn for releathering.

Bore of Pump Top and Main Pipes ins.	**3**	**3½**	**4**	**4½**	**5**
Bore of Working Barrel ... ... "	**2½**	**3**	**3½**	**4**	**4½**
For Well 30ft. deep under surface	103/-	115/-	132/-	148/-	170/-
Extra per foot, above 30 ft.	2/6	3/-	3/6	3/9	4/-
" for Brass Bucket and Valves	5/-	7/-	9/-	10/6	12/-
Extra for Door for Access to Bucket and Valve	10/-	11/-	12/6	15/-	20/-
Extra for additional Spouts or Branches each	3/6	4/-	4/6	5/-	6/-
Approx. depth of Well to which one man can work this Pump ft.	100	75	60	50	40

Prices of Suction and Rising Main include Bolts, Packing and Rods, with Coupling Joints.

GUN-METAL HAND FEED PUMP

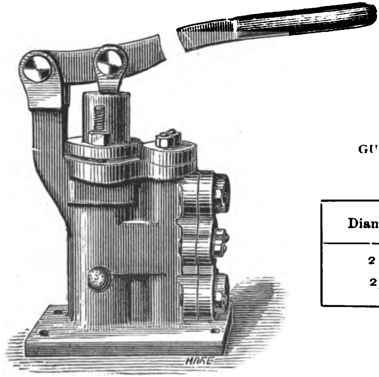
OR HYDRAULIC PRESSURE PUMP



Diam. of Plunger ...	1 in.	1¼ in.	1½ in.
Price without Plank...	50/-	65/-	80/-
Price with Plank ...	58/-	73/-	88/-

HAND FEED PUMP

As supplied to meet Regulations of German Government.



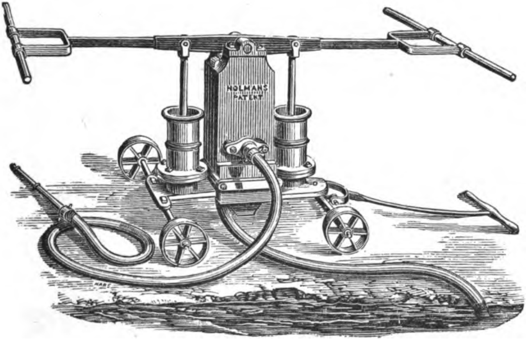
GUN-METAL PLUNGER, VALVES AND SEATS

Diam. of Ram	Price
2 ins.	£6 0 0
2½ "	7 10 0

HOLMAN'S

PORTABLE IRRIGATING PUMP

AND FIRE ENGINE

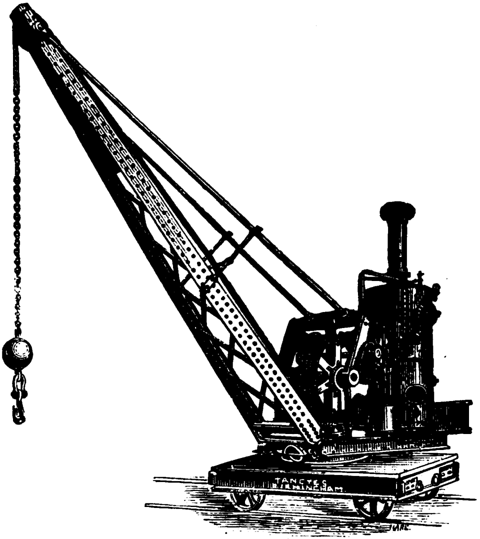


This Pump has brass barrels, doorway for immediate access to the valves; wrought-iron double lever handles, with sockets to shift, brass union on suction and delivery ready for connecting hose, the whole mounted on four strong wheels, with a drag handle and turn carriage. The pump can, if desired, be easily disconnected from the carriage, and bolted down, as a fixture, to timber or stone.

With two	4 in.	brass barrels,	for about	1600	galls.	per hour...	...£15	0
"	5 "	"	"	2500	"	"	 21	0
"	6 "	"	"	3600	"	"	 26	0
"	7 "	"	"	4900	"	"	 34	0

Suction and Delivery Hose and Branch Pipes not included in above Prices. For these see page 267.

TANGYES' PORTABLE STEAM CRANE

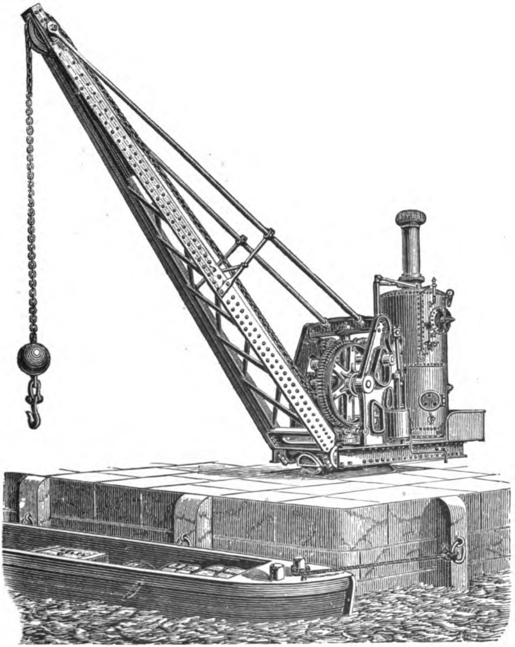


This Crane lifts the specified weight with single chain and double gear. The 7-ton size, lifts its maximum load with double chain and double gear.

Price includes sufficient chain, with hook and ball, to reach ground level.

Tested to	Radius	Price	Steam self-propelling gear without load	Canopy to protect Driver	Clips for rails per set
2 tons	16 ft.	£280	£40	£14	60/-
3 "	16 "	330	50	16	80/-
4 "	18 "	390	50	16	100/-
5 "	18 "	450	70	20	120/-
7 "	18 "	520	80	20	130/-

TANGYES' STATIONARY STEAM CRANE

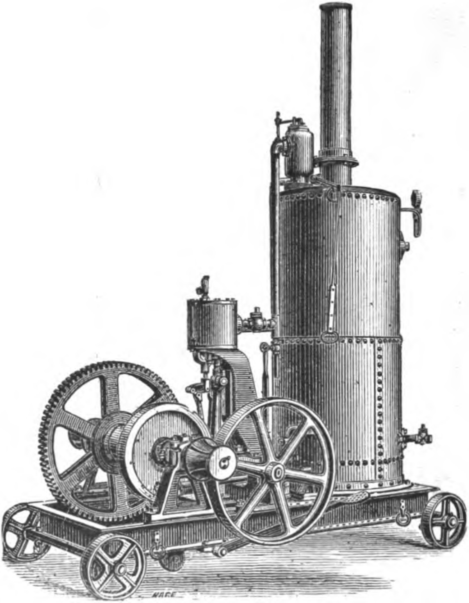


Price includes sufficient chain, with hook and ball, to reach ground level.

Tested to	Radius	Price	Canopy to protect Driver
2 tons	16 ft.	£280	£14
3 "	16 "	330	16
4 "	18 "	385	16
5 "	18 "	440	20
7 "	18 "	510	20

TANGYES' PORTABLE

STEAM HOISTING ENGINE



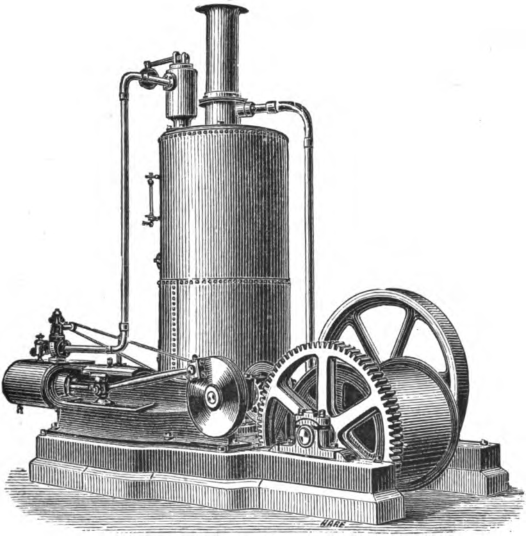
This Engine will raise the specified weight at a speed of about 100 feet per minute. It is fitted with link motion reversing gear, and friction brake. The hoisting barrel may be thrown out of gear. The Engine and Boiler are fixed on a wrought-iron carriage, which forms the tank for supplying the Boiler with water. Either flanged wheels for rails or flat for ordinary roads can be supplied.

Tested to	Price	Hoisting Engine on Cast-iron Base, without Feed Pump, Boiler, or wheels	Warping Barrels, extra
12 cwts.	£135	£80	40/-
20 "	175	105	80/-

No Governor supplied with these Hoisting Engines.

TANGYES' IMPROVED

STEAM HOISTING ENGINE



This arrangement consists of a "Tangye" Engine with Feed Pump, spur pinion on the engine shaft, working into a spur wheel on the drum shaft, cast-iron drum, with shaft and carriages, foot-strap brake, and friction clutch, to throw the drum in and out of gear. The Boiler has the necessary steam and furnace fittings, see page 40. The whole is mounted on a cast-iron base.

The winding drum can be thrown out of gear and the Engine then used for driving purposes.

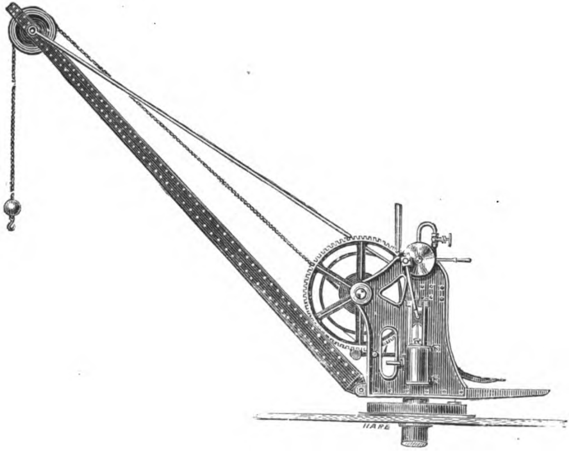
Diam. Cylinder	Length Stroke	Speed rope per min.	Tested to	Price	Approx. weight
6 ins.	12 ins.	200 feet	7 cwts.	£140	65 cwts.
8 "	16 "	250 "	10 "	185	95 "
9 "	18 "	300 "	12 "	225	110 "

Link motion reversing gear, extra.

TANGYES'

FIXED STEAM CRANE

For Ships' Decks, Wharves, &c.



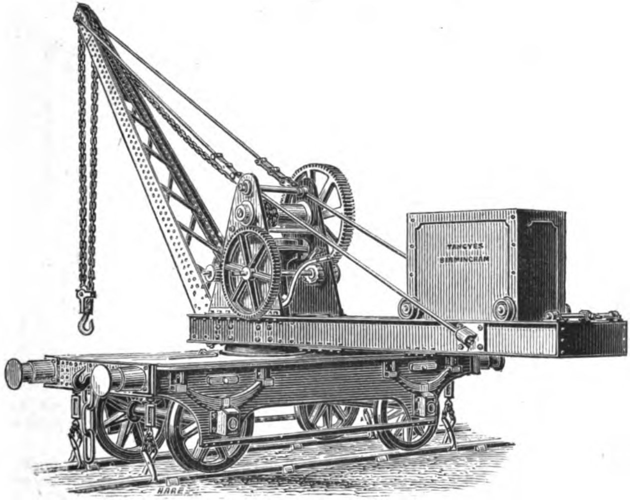
This Crane has two cylinders fixed on Crane Frames. The slewing is effected by friction clutches and spur gearing. The motion can be reversed by a simple throw of clutch handle. A powerful Foot Brake is provided for lowering. The Crane Post is a best hammered iron forging. The Engines work at 40lbs. steam pressure, and lift the load with single chain and single purchase, except the three ton size which has double purchase.

Price includes sufficient chain, with hook and ball, to reach ground level.

Tested to ... ...tons	1	2	3
Radius ... ... ft.	15	15	15
Diam. Cylinder ... ... ins.	5	6	7
Length Stroke ... ... "	9	10	10½
Weight, approx. ... ...tons	3	4	5
Price ... ... £	**125**	**155**	**200**

TANGYES'

POWERFUL RAILWAY ACCIDENT CRANE



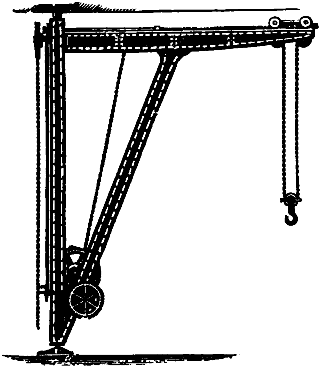
Mounted on strong wrought-iron carriage with wheels 3ft. diam., 4ft. 8½ ins. gauge, and axle boxes; wrought-iron tail plates. Cast-iron balance box worked by screw with cast-iron tube to protect same. Lowering brake. Jib 16ft. radius, to lower down entirely or fix at various angles without varying the position of the anti-friction pulley below. Snatch Block and sufficient Chain to reach ground and clips for rails.

Tested to 5 tons	**Price...**	£270
" 10 "	"	£365

This Crane can be made with pitch chain wheel or barrel as desired.

Our Patent Safety Brake, as described on page 110, can be applied to above Crane at a slight extra cost. This Brake has the valuable property of safely sustaining the load when the men have left the handles.

TANGYES' FOUNDRY CRANE



The main framing of this Crane is constructed entirely of wrought-iron, in convenient sections for shipment, the sides being of plates with angle iron flanges and tee iron stiffeners.

It is fitted with single and double purchase hoisting gear, strap screw brake, and radial chain traversing gear, all being within easy reach of the operator.

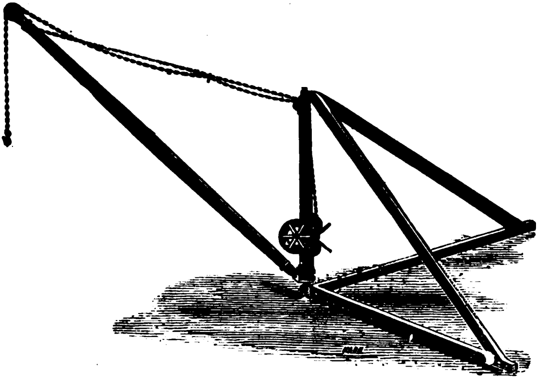
Price includes sufficient chain, with block, to reach ground level.

Tested to... ...tons	3	5	10
Radius ... ... ft.	14½	15	20
Height Lift ... "	11½	14	17
" Overall "	15	18	21½
Weight approx. cwts.	55	85	135
Price ... ... £	90	140	250

Our Patent Safety Brake, as described on page 110, can be applied to above Crane at a slight extra cost. This Brake has the valuable property of safely sustaining the load when the men have left the handles.

These dimensions can be altered to suit the requirements of purchasers at small extra cost.

TANGYES' HAND DERRICK CRANE



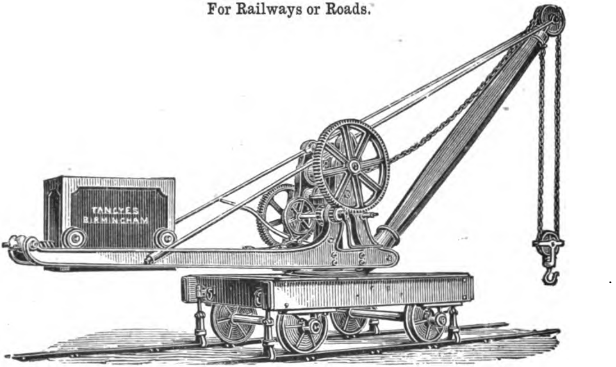
This Crane has single and double purchase lifting gear, safety derrick gear for altering the radius, and sufficient chain to reach ground level.

The jib swings 250°, and, being hung on pivots top and bottom, requires very little power to slew it.

Tested to ... ... tons	1	1½	2	3	4	5	8	10
Length Jib ... .. ft.	25	25	30	30	30	35	35	35
Max. Radius ... ... "	20	20	25	25	25	30	30	30
Price ... ... £	35	40	50	65	80	100	140	180

TANGYES' PORTABLE HAND CRANE

For Railways or Roads.



With single and double purchase lifting gear, powerful strap brake and lever, two winch handles, strong iron column and bed-plate, turned roller path, adjustable balance box, which may be regulated according to the weight raised, wood jib, sufficient chain with block to reach ground level, the whole mounted upon strong wood-framed travelling carriage, with four cast-iron wheels, with wrought-iron axles for rails of any gauge, sufficient to afford the necessary base for stability.

Tested to	Radius	Price	Clips, extra
12 cwts.	8 ft.	£31	30/-
1 ton	8 "	33	30/-
2 "	10 "	52	40/-
3 "	12 "	78	50/-
4 "	12 "	98	60/-
5 "	14 "	125	65/-
7 "	14 "	160	65/-
8 "	14 "	170	70/-
10 "	14 "	210	70/-
12 "	14 "	230	75/-

JOHN JOHNSON
Bibl Bodl.

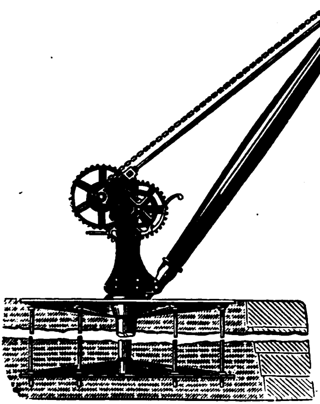
The 12 cwt. and 1 ton Cranes have single purchase gear only and fixed balance boxes.

This Crane can be supplied with wrought-iron tubular, or plated jibs, and wrought-iron carriage with chequered iron floor plates, at an extra cost.

Our Patent Safety Brake, as described on page 110, can be applied to above Crane at a slight extra cost. This Brake has the valuable property of safely sustaining the load when the men have left the handles.

In ordering, state gauge of rails or if required for roads.

TANGYES' HAND WHARF CRANE



With single and double purchase lifting gear, powerful strap brake and lever, two winch handles, strong iron crane post and foundation plates and bolts, wood jib, turned roller path, sufficient chain, with block, to reach ground level.

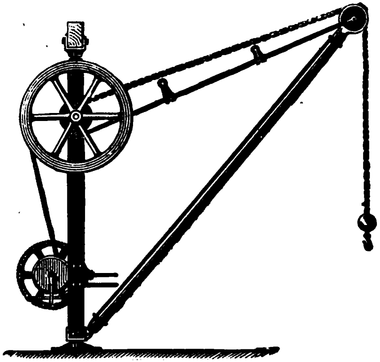
Tested to	Radius	Price
12 cwt.	8 ft.	£23
1 ton	8 "	32
1½ "	9 "	37
2 "	10 "	41
3 "	12 "	48
4 "	12 "	70
5 "	14 "	87
8 "	14 "	141
10 "	14 "	165

The 12 cwt. and 1 ton Cranes have single purchase gear only.

This Crane can be supplied with wrought tubular jib at an extra cost.

Our Patent Safety Brake, as described on page 110, can be applied to above Crane at a slight extra cost. This Brake has the valuable property of safely sustaining the load when the men have left the handles.

TANGYES' PILLAR OR WHIP CRANE



This Crane has three motions, viz.,—quick, medium, and slow. Light weights may be lifted at a quick speed by pulling directly at the rope; for medium weights the handle is put on the rope barrel shaft; and for heavy loads on the pinion shaft.

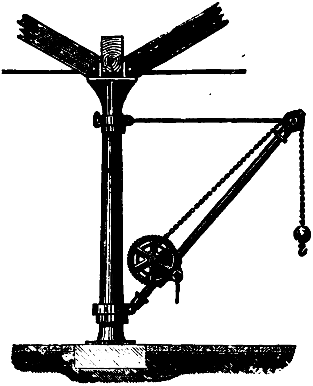
The speeds are rapidly changed. The Crane is made to swing completely round, and is provided with an efficient brake.

Price includes sufficient chain, with hook and ball, to reach ground level.

Tested to ... tons	1	2
Radius ... ...ft.	12½	12½
Height Lift ... ... "	12¼	12¼
" Overall ... "	14½	14½
Price ... ...£	28	39

In ordering give size of timbers to which Crane is to be attached.

TANGYES' PILLAR CRANE



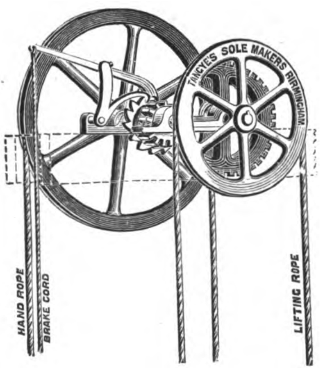
This Crane is designed for attaching to existing columns or pillars
It is fitted with a powerful brake, and made to swing completely round.
The Jib is of tubular wrought-iron, combining strength with lightness.
The column and clips shewn in illustration are not included in price.

Tested to... ... ... cwts.	5	10
Height ... ... ft.	9	9
Radius ... ... "	8	8
Price of Crane, with sufficient "BB" Crane Chain, with hook and ball, for 10 ft. lift ... £	9	11
Extra Chain, per foot	8d.	9d.

Clips for fixing to Columns or Pillars extra, according to size.

TANGYES'

HAND WAREHOUSE HOIST



In this Hoist the lifting rope runs on a grooved pulley of large diameter—the balance weight hanging on one end of this rope and the cage on the other. Keyed on same shaft as the grooved pulley are the brake and spur wheels—the spur wheel being driven by a pinion keyed on the shaft of the hand rope wheel.

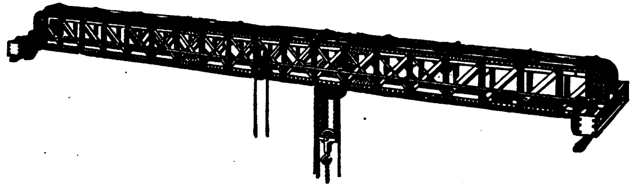
Tested to	Price	Lift rope per foot	Hand rope per foot.
5 cwts.	£12	4d.	4d.
10 "	15	6d.	4d.
15 "	25	9d.	4d.

The 5 and 10 cwt. sizes are single gear.
The 15 cwt. size is double gear.
Cage, Balance Weight, and Guides, not included in above prices.
Quotations on receipt of necessary particulars.

TANGYES'

LATTICE GIRDER OVERHEAD TRAVELLER

For use with Cherry's Patent Crab.



This Traveller comprises :—

Wrought-iron Lattice Girder.
A two-wheeled Carriage at each end.
Longitudinal Travelling Gear.

Span in feet	35	40	45	50	55	60
Tested to						
1 ton						
2 "						
3 "						
4 "						
5 "						
6 "						
7 "						
8 "						
10 "						
12 "						

Quotations on receipt of necessary particulars.

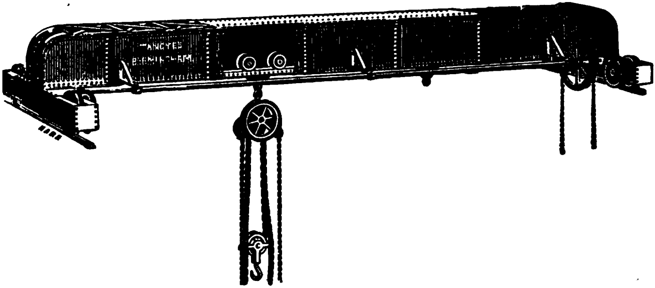
For particulars of Cherry's Patent Crab, which is recommended for use with this Traveller, see page 110.

TANGYES'

BOX GIRDER OVERHEAD TRAVELLER

WITH RUNNER

For use with Pulley Blocks.



This Traveller comprises :—

A Wrought-iron Box Girder.
A two-wheeled Carriage at each end.
Runner to support Blocks.
Longitudinal Travelling Gear.

Span in feet	15	20	25	30	35	40
Tested to						
1 ton						
1½ "						
2 "						
2½ "						
3 "						
4 "						
5 "						
6 "						

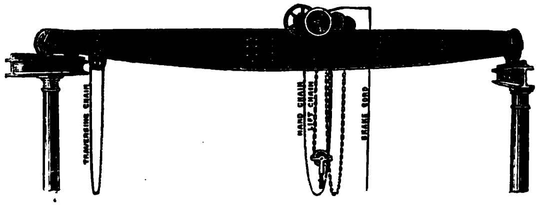
Quotations on receipt of necessary particulars.

For suitable Pulley Blocks to work with this Traveller, see pages 120 *to* 123.

TANGYES'

DOUBLE PLATE GIRDER TRAVELLER

For use with Cherry's Patent Crab.



This Traveller comprises :-

Two Wrought-iron Girders.
A two-wheeled Carriage at each end.
Longitudinal Travelling Gear.
A "Cherry's" Patent Brake Crab.

Span in feet	10	15	20	25	30
Tested to					
1 ton	£17	£22	£48	£63	£78
2 "	19	25	50	65	81
3 "	24	31	58	75	92
4 "	39	47	74	91	110
5 "	43	53	81	98	115
6 "	53	76	91	106	125
8 "	83	102	112	136	160
10 "	98	115	135	145	165

For intermediate spans take the mean between size above and below.
In ordering state height of lift for Chains.

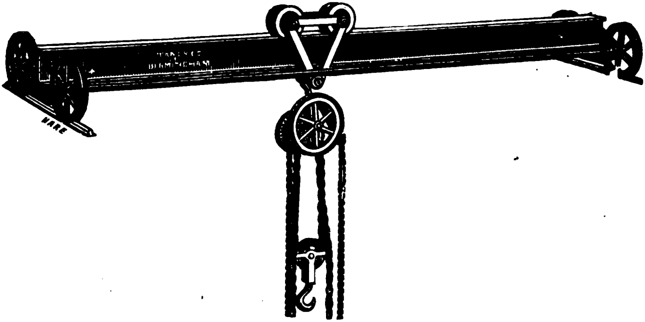
For particulars of Cherry's Patent Crab, see page 110.

TANGYES'

SINGLE GIRDER OVERHEAD TRAVELLER

WITH RUNNER

For use with Pulley Blocks.



This Traveller comprises :—

A Single Wrought-iron Girder.
A two-wheeled Carriage at each end.
Runner to support Blocks.

Span in feet	12		14		16		18		20	
Tested to										
1 ton	£13	0	£13	10	£14	0	£15	0	£16	0
2 "	16	0	17	0	18	0	19	0	20	0
3 "	20	0	21	0	22	0	24	0	25	0
4 "	26	0	27	0	28	0	29	0	30	0

The Block shown in illustration is not included in price.

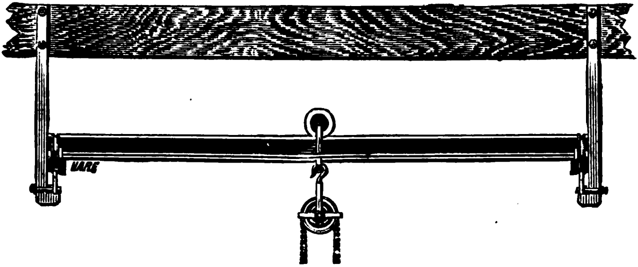
For suitable Pulley Blocks to work with these Travellers, see pages 120 *to* 123.

TANGYES'

SINGLE GIRDER OVERHEAD TRAVELLER

WITH RUNNER

For use with Pulley Blocks.



This Traveller comprises :-

Wrought-iron Girder.
A two-wheeled Carriage at each end.
Runner for Pulley Block.

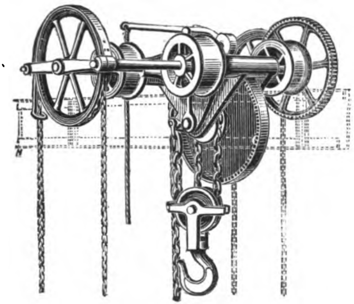
Tested to	Price for 10 feet span	Add for each foot extra span	Add for each foot Longitudinal Traverse
10 cwts.	£10	10/-	5/-
12 "	12	12/-	6/-

This Traveller is not made of longer span than 16 feet.
Pulley Block is not included in price.

For suitable Pulley Blocks for working with these Travellers, see pages 120 *to* 123.

CHERRY'S PATENT BRAKE CRAB

TANGYES LIMITED. SOLE MAKERS



The Brake on this Crab automatically sustains the load when the motive power is entirely removed, without increasing the resistance during lifting.

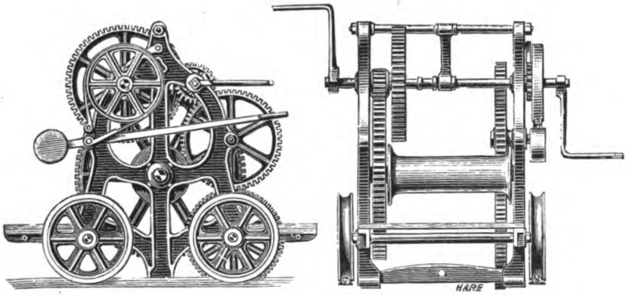
The friction necessary for this purpose is obtained from, and is in exact proportion to, the load itself.

In lowering, the pressure so produced is relieved by a lever to the extent necessary to allow the weight to descend at any desired speed. This device however does not prevent the load being gently lowered by pulling the hand chain in the direction reverse to that of lifting.

Tested to	Price Crab	Price Lifting Chain	Price Hand Chain	Price Traverse Chain	Size Lifting Chain
1 ton	£7	9d. per ft.	7d. per ft.	...	3/8 in.
2 "	9	10d. "	7 "	...	7/16 "
3 "	15	11d. "	7 "	7d. per ft.	1/2 "
4 "	23	1/3 "	8 "	8 "	5/8 "
5 "	28	1/3 "	8 "	8 "	5/8 "
6 "	36	1/6 "	8 "	8 "	3/4 "
7 "	42	1/6 "	8 "	8 "	3/4 "
8 "	50	2/3 "	9 "	9 "	7/8 "
10 "	58	2/3 "	9 "	9 "	7/8 "
12 "	75	3/- "	10 "	10 "	1 "
14 "	85	3/- "	10 "	10 "	1 "

No Traverse Chain is required with 1 and 2 ton sizes.
Length of Hand and Traverse Chains is twice the height of lift.
" of Lift Chain is twice the height of lift plus 4 ft.

TANGYES' OVERHEAD TRAVELLER CRAB



CRAB WITH BRAKE AND WOOD PLATFORM.

No.	To Test to, with Single Sheave Block	Weight	Price	Brass Bushing
1	4 tons	17 cwts.	£27	£1 17 6
2	6 "	20 "	31	2 7 6
3	12 "	29 "	38	3 0 0

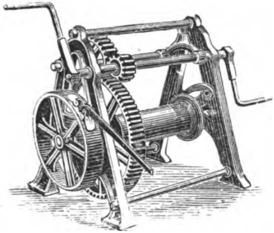
LONGITUDINAL TRAVELLING GEAR & TWO GANTRY CARRIAGES.

For use with above.

No.	Price	Weight
1	£13 10	11 cwts.
2	16 10	16 "
3	19 10	18 "

TANGYES' HOISTING CRAB

With Cast-iron Sides.



SINGLE PURCHASE

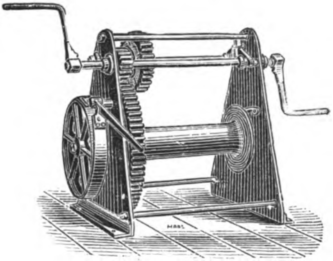
Size	To lift with 2 and 3 sheave pulley blocks	Price			Brass bushing extra
		Without brake	With ordinary brake	With improved Screw brake	
No. 1	2 tons	£2 5 0	£2 15 0	£3 0 0	12/6
" 2	3 "	2 9 0	2 19 0	3 5 0	12/6
" 3	4 "	2 18 0	3 9 0	3 16 0	14/6
" 4	5 "	3 9 0	4 0 0	4 9 0	14/6
" 5	6 "	4 8 0	5 4 0	5 14 0	16/6
" 6	9 "	5 6 0	6 4 0	6 16 0	16/6

DOUBLE PURCHASE

Size	To lift with 2 and 3 sheave pulley blocks	Price			Brass bushing extra
		Without brake	With ordinary brake	With improved Screw brake	
No. 10	4 tons	£3 9 0	£4 0 0	£5 6 0	18/-
" 11	5 "	4 0 0	4 12 0	6 0 0	18/-
" 12	6 "	5 0 0	5 17 0	7 4 0	20/-
" 13	9 "	6 0 0	6 17 0	8 4 0	22/-
" 14	12 "	7 5 0	8 3 0	9 14 0	22/-
" 15	15 "	9 8 0	10 8 0	12 18 0	31/-
" 16	17 "	11 16 0	13 4 0	15 14 0	40/-
" 17	20 "	16 0 0	18 0 0	21 8 0	42/-

TANGYES' IMPROVED HOISTING CRAB

With Wrought-iron Sides.



SINGLE PURCHASE

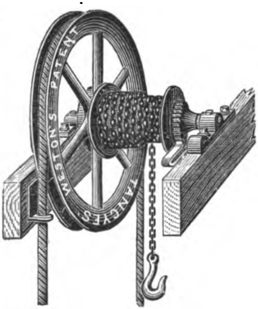
Size	To lift with 2 & 3 sheave pulley blocks	Price			Brass bushing extra
		Without brake	With ordinary brake	With improved screw brake	
No. 1	2 Tons	£3 9 0	£4 0 0	£4 6 0	12/6
" 2	3 "	3 14 0	4 4 0	4 11 0	12/6
" 3	4 "	4 6 0	4 18 0	5 5 0	14/6
" 4	5 "	4 14 0	5 6 0	5 16 0	14/6
" 5	6 "	5 14 0	6 11 0	7 0 0	16/6
" 6	9 "	6 9 0	7 8 0	8 0 0	16/6

DOUBLE PURCHASE

Size	To lift with 2 & 3 sheave pulley blocks	Price			Brass bushing extra
		Without brake	With ordinary brake	With improved screw brake	
No. 10	4 Tons	£5 6 0	£5 18 0	£7 3 0	18/-
" 11	5 "	5 14 0	6 6 0	7 14 0	18/-
" 12	6 "	6 17 0	7 13 0	9 0 0	20/-
" 13	9 "	7 18 0	8 16 0	10 3 0	22/-
" 14	12 "	9 6 0	10 5 0	11 14 0	22/-
" 15	15 "	11 6 0	12 7 0	14 15 0	31/-
" 16	17 "	13 14 0	15 4 0	17 12 0	40/-
" 17	20 "	17 16 0	19 16 0	23 4 0	42/-

TANGYES'

"WESTON" DESPATCH HOIST "A"



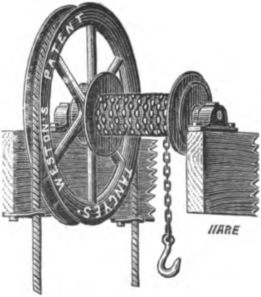
This Hoist is intended for articles not liable to injury if let down quickly. The load remains suspended until released by reversing the action of the main wheel. The descent can be regulated by this wheel, the rope remaining stationary.

Tested to 2½ cwts.		£3	15	0
B.B. Chain, with one Hook ...	per foot ...	0	0	5
Hand Rope	" " ...	0	0	3

In ordering state height of lift.

TANGYES'

"WESTON" SAFETY HOIST "B"



This Hoist is adapted for goods requiring care in lowering. The main wheel on being reversed causes the load to descend at a moderate speed, and can be kept going by an occasional pull at the rope. If the load be allowed to run it will gradually stop. If the rope be suddenly "let go" whilst lifting, the load will remain suspended.

Tested to 2½ cwts.		£3	15	0
B.B. Chain, with one Hook	per foot...	0	0	5
Hand Rope	" " ...	0	0	3

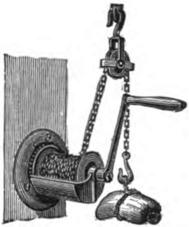
If these Hoists are required to lift 5 *cwts. add a single sheave Pulley Block price* 3/6.

In ordering state height of lift.

TANGYES' "WESTON"

SAFETY BRACKET CRABS "C" & "D"

To fix to a Post, Wall, or Crane.



CRAB "D"

Crab "C" is the same design as "D." It is intended for articles not liable to injury if let down quickly. The load remains suspended until released by reversing the action of the handle. The descent can be regulated by the handle.

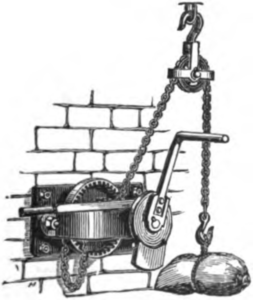
Crab "D" is self-sustaining. The lowering is effected only by reversing the action of the handle, so that no accident can possibly occur from the handle running rapidly round.

	£	s.	d.
Tested to 2½ cwts.	£2	13	0
Pulley to lead to load	0	3	6
B.B. Chain with Hook, per foot	0	0	5

In ordering state length of Chain required.

CHERRY'S PATENT

SELF-SUSTAINING WALL CRAB



This Crab is self-sustaining. It is fitted with a brake for lowering out quickly. It may be fixed in any position, but the lifting chain must be led away in the direction indicated by the arrow stamped on the Crab.

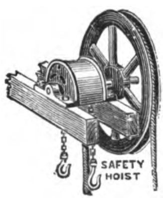
Tested to ... cwts.	5	10	20
Price ... ... £	4 10	6	8
Bright Chain, per foot	7d.	9d.	10d.
Pulley to lead to load	5/-	9/-	11/-

In ordering state length of Chain required.

N.B.—The Lifting Chain should pass over Chain Wheel and not under as shown in illustration.

TANGYES' "WESTON'

DOUBLE LIFT SAFETY HOIST "E"



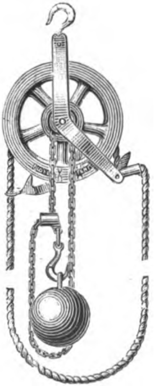
This Hoist is self-sustaining, and the load remains suspended should hand rope be let go. The lowering is effected by pulling the rope from the other side of wheel.

Tested to ... cwts.	2½	5	10
Price ... ... £	2 7	4 0	7 10
Bright Chain, with 2 Hooks, per foot	5d.	7d.	9d.
Rope ... ... "	3d.	3d.	3d.

Length Chain required is one foot more than height of lift.
" Rope " double height of lift.

FLOYD'S PATENT

SELF-SUSTAINING HAND HOIST



Upon the lifting chain is a 'clip' which assumes the position shown in engraving, and grips the chain—when the load is on. When the load is removed the 'clip' falls to the bottom ready for another load.

The hand rope is held by a similar 'clip,' which is put into action by moving the rope slightly out of the perpendicular.

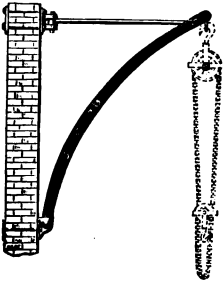
Tested to ... ... cwts.	2½	5
Price	35/-	50/-
Bright Chain, with Hook, per ft.	5d.	7d.
Rope ... ... "	3d.	3d.

Length Chain and Rope required is twice the height of lift.

TANGYES'

WROUGHT-IRON JIB CRANE

With Cast-iron Brackets and Plates, Wall Bolts and Nuts



Tested to	½ ton	1 ton	2 tons
Price ... ... £	3 15	4 15	5 15

Radius, 3 feet; Height, about 5 feet.

For each additional foot radius add one-fourth to the above prices. The Crane is made proportionately higher.

WESTON'S PULLEY BLOCK

Suitable for this Crane.

Tested to ... tons	½	1	1½	2	3
Price	12/6	17/6	25/-	32/-	45/-
Bright Chain, per ft	6d.	7d.	8d.	9d.	10d.

In ordering state Radius and Height, also thickness of wall for Bolts.
The Pulley Blocks should be at least one size larger than the Crane.

For price Weston's Blocks, see pages 120 *to* 122.
" " *Self-sustaining Brake Block, see page* 123.

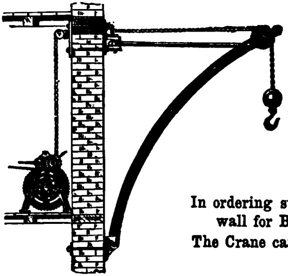
SHORT LINK CRANE CHAIN

Diam. Iron ... ins.	¼	5/16	⅜	7/16	½	9/16	⅝	11/16	¾	⅞	1	1⅛
Average weight per yard. ...lbs.	2¼	3¼	4½	6	8	10	12	15	18	24	30	45
"Common," tested Per cwt.	29/-	24/-	20/-	18/-	16/-	15/6	15/-	14/9	14/6	14/-	13/6	13/6
"B" tested "	36/-	29/-	25/-	22/6	20/3	19/9	19/6	19/3	19/-	18/6	18/-	16/3
"B B" " "	41/-	33/-	27/9	26/-	23/9	22/-	21/6	21/-	20/6	20/3	20/-	17/6
"BBB" " "	44/6	35/6	31/-	28/3	25/3	24/6	24/-	23/9	23/6	23/-	22/6	21/-
Navy Test ... tons		1⅛	1⅝	2¼	3	3¾	4⅝	5⅝	6¾	9⅛	12	15¼

The "BBB" quality is proved to the 'Navy Test' as given in table.
NOTE.—In actual work the Load should not exceed half the proof.

TANGYES' WROUGHT-IRON JIB CRANE

No. A.



With Cast-iron Brackets and Plates, Bolts and Nuts, Guide Pulleys, Roller and Chain Wheel.

Radius, 3 ft.; Height, about 5 ft. For each additional foot radius add one-fourth to price of Crane. The Crane is made proportionately higher.

In ordering state Radius and Height, also thickness of wall for Bolts.

The Crane can be supplied with or without Crab.

Tested to	½ ton	1 ton	2 tons
Jib Crane ... ... £	4 10 0	6 0 0	7 10 0
Crab ... ... £	2 9 0	4 0 0	6 0 0
" Brake ... ... extra	0 10 0	0 12 0	0 17 0
BB Chain, with Hook & Ball, per ft.	8d.	10d.	1/-
Size of Chain ... ... ins.	5/16	7/16	9/16

TANGYES' WROUGHT-IRON JIB CRANE

No. B.

Similar to above, but with Eye and Single Sheave Block, by which power is doubled, speed of lift being reduced one half.

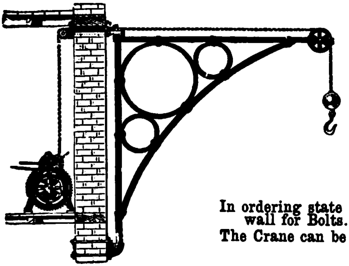
Radius, 3 ft.; Height, about 5 ft. For each additional foot radius add one-fourth to price of Crane. The Crane is made proportionately higher.

Tested to	½ ton	1 ton	2 tons
Jib Crane ... ... £	5 0 0	6 10 0	8 10 0
Crab ... ... £	2 5 0	2 18 0	4 0 0
" Brake ... ... extra	0 10 0	0 11 0	0 12 0
BB Chain, with Hook ... per ft.	5d.	8d.	10d.
Size of Chain ... ... ins.	3/16	5/16	7/16

The Crane can be supplied with or without Crab.
In ordering, state Radius and Height, also thickness of wall for Bolts.

TANGYES' WROUGHT-IRON JIB CRANE

No. C.



With Cast-iron Brackets and Plates, Bolts and Nuts, Guide Pulleys, Roller and Chain Wheel.

Radius 3 ft.; Height, about 4 ft. For each additional foot radius add one-fourth to price of Crane. The Crane is made proportionately higher.

In ordering state Radius and Height, also thickness of wall for Bolts.
The Crane can be supplied with or without Crab.

Tested to	½ ton	1 ton	2 tons
Jib Crane ... ... £	5 10 0	7 0 0	8 10 0
Crab ... ... £	2 9 0	4 0 0	6 0 0
" Brake ... ... extra	0 10 0	0 12 0	0 17 0
BB Chain, with Hook & Ball, per ft.	8d.	10d.	1/-
Size of Chain ... ... ins.	5/16	7/16	9/16

TANGYES' WROUGHT-IRON JIB CRANE

No. D.

Similar to above, but with Eye and Single Sheave Block, by which power is doubled, speed of lift being reduced one half.

Radius 3 feet, Height about 4 feet. For each additional foot radius add one fourth to price of Crane. The Crane is made proportionately higher.

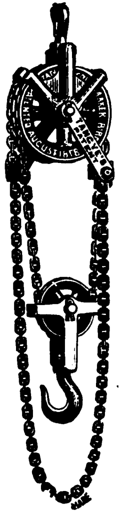
Tested to	½ ton	1 ton	2 tons
Jib Crane ... ... £	6 0 0	7 10 0	9 10 0
Crab ... ... £	2 5 0	2 18 0	4 0 0
" Brake ... ... extra	0 10 0	0 11 0	0 12 0
BB Chain, with Hook per ft.	5d.	8d.	10d.
Size of Chain ... ... ins.	3/16	5/16	7/16

The Crane can be supplied with or without Crab.
In ordering, state Radius and Height, also thickness of wall for Bolts.

IMPROVED WESTON'S DIFFERENTIAL PULLEY BLOCKS

Tangyes' Patent, August, 1878.

These Blocks are fitted with Tangyes' Patent Chain Guides, patented, August, 1878, which prevent the troublesome locking of chains, and enable the Blocks to be used horizontally or at any desired angle.



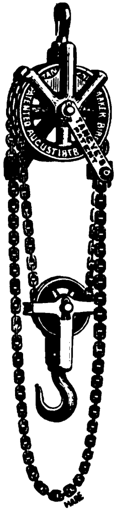
IN THE HIGH COURT OF JUSTICE.

CHANCERY DIVISION.

TANGYE v. PRIEST.

NOTICE IS HEREBY GIVEN that a reward of TWENTY POUNDS will be paid by TANGYES LIMITED of Cornwall Works Smethwick near Birmingham to any one giving to them or their Solicitors the first information which will lead to the detection of and the granting of a similar Injunction to that in the above cause, against any other person or persons MAKING BUYING or SELLING Weston's Pulley Blocks having MR. GEORGE TANGYE'S Improved Guides (patented August 1878) or colourable imitations thereof attached thereto. Apply to Messrs. J. B. CLARKE & CO. 40 Waterloo Street, Birmingham Solicitors to Tangyes Limited.

February 27th, 1881.



REDUCED PRICES

Tested to ... cwts.	5	10	12	20	30	40	60	80
Blocks per set... ...	8/-	12/6	12/6	17/6	25/-	32/-	45/-	65/-
Bright Chain per ft.	5d	5d.	6d.	7d.	8d.	9d.	10d.	11d.

The length of chain required is rather more than 4 times height of lift.

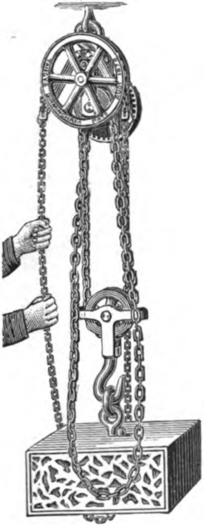
PARTS OF WESTON'S PULLEY BLOCKS FOR REPAIRS

Tested to, cwts.	5	10	12	20	30	40	60	80	100	120
Top Block ...	6/-	10/-	10/-	15/-	20/-	24/6	36/-	51/-	80/-	95/-
Top Sheave ...	2/6	3/-	3/-	4/6	8/6	11/6	12/6	15/6	22/-	42/-
Bottom Block...	2/6	3/6	3/6	5/-	7/-	9/-	11/-	16/6	38/-	55/-
Bottom Sheave	1/3	1/3	1/3	1/6	2/-	2/3	3/-	4/6	7/3	9/-

IMPROVED WESTON'S DIFFERENTIAL PULLEY BLOCKS

Tangyes' Patent, August, 1878.

These Blocks are fitted with Tangyes' Patent Chain Guides, patented August, 1878, which prevent the troublesome locking of chains, and enable the Blocks to be used horizontally or at any desired angle.



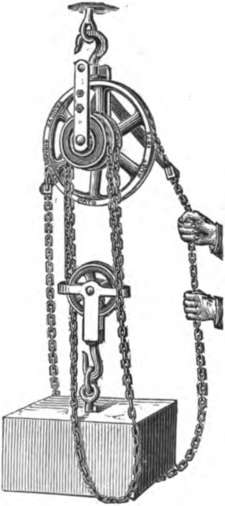
IN THE HIGH COURT OF JUSTICE.

CHANCERY DIVISION.

TANGYE v. PRIEST.

NOTICE IS HEREBY GIVEN that a reward of TWENTY POUNDS will be paid by TANGYES LIMITED of Cornwall Works Smethwick near Birmingham to any one giving to them or their Solicitors the first information which will lead to the detection of and the granting of a similar Injunction to that in the above cause, against any other person or persons MAKING BUYING or SELLING Weston's Pulley Blocks having MR. GEORGE TANGYE'S Improved Guides (patented August 1878) or colourable imitations thereof attached thereto. Apply to Messrs. J. B. CLARKE & CO. 40 Waterloo Street, Birmingham Solicitors to Tangyes Limited.

February 27th, 1884.



WITH TANGYES' GEAR

Tested to	Blocks per set	Lift Chain per foot	Hand Chain per foot
2 Tons	£2 15 0	9d.	6d.
3 "	3 5 0	10d.	6d.
4 "	4 0 0	11d.	6d.
5 "	5 10 0	1/-	7d.
6 "	7 0 0	1/3	7d.
8 "	9 0 0	1/6	7d.
10 "	12 0 0	1/9	8d.

WITH SPOCKET WHEEL

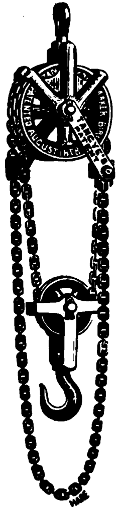
Tested to	Blocks per set	Lift Chain per foot	Hand Chain per foot
1½ Tons	£1 15 0	8d.	6d.
2 "	2 5 0	9d.	7d.
3 "	3 0 0	10d.	8d.
4 "	3 15 0	11d.	8d.

The length of lift chain required with these Blocks is twice height of lift plus 6 feet.
" hand " " " twice height of lift.

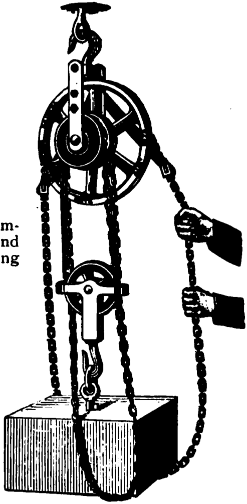
EXTRA STRONG

IMPROVED WESTON'S DIFFERENTIAL PULLEY BLOCKS

(Tangyes' Patent, August, 1878.)



These Blocks are recommended for heavy and continuous work, being more durable.



No.	Size	Tested to	Blocks per set	Bright Chain per ft.
	Cwts.	Cwts.		
1	5	10	12/6	5d.
2	10	15	17/6	6d.
3	20	30	25/-	8d.
4	30	40	32/-	9d.
5	40	60	45/-	10d.
6	60	80	65/-	11d.

Length of chain required is rather more than four times height of lift.

WITH SPOCKET WHEEL

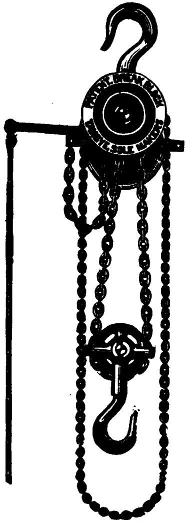
No.	Size	Tested to	Blocks per set	Lift Chain per ft.	Hand Chain per ft.
	Cwts.	Cwts.			
10	20	30	35/-	8d.	6d.
11	30	40	45/-	9d.	7d.
12	40	60	60/-	10d.	8d.
13	60	80	75/-	11d.	8d.

Length of lift chain required is twice height of lift plus 6 feet.
Hand chain twice height of lift.

CHERRY'S PATENT

SELF-SUSTAINING BRAKE BLOCK

TANGYES LIMITED, SOLE MAKERS.



The advantage this Block possesses above others is its **freedom from friction.** It is as frictionless as an ordinary crab, and with it a man can do at least three times as much work as with ordinary Blocks.

The Block is self-sustaining. It is fitted with Self-acting Brake. The weight can be lowered rapidly and without exertion by pulling the brake cord.

The usual method of lowering, viz., by pulling hand chain, may also be adopted.

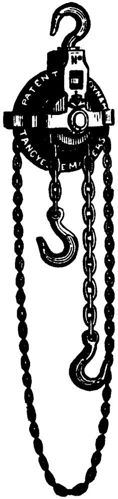
Tested to	BLOCKS per set	Bright Lift Chain	Bright Hand Chain
½ ton	£1 15 0	6d. per ft.	5d. per ft.
1 "	2 5 0	7d. "	5d. "
2 "	3 0 0	9d. "	7d. "
3 "	6 0 0	10d. "	7d. "
4 "	7 10 0	11d. "	7d. "
6 "	18 0 0	1/3 "	7d. "

The length of lift chain required is 3 feet more than double the height of lift.
" " hand chain " 3 feet less " " "
In ordering state height of lift.

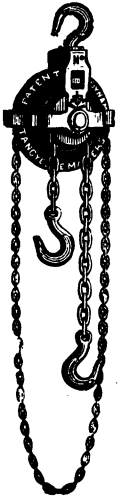
TANGYES'

DOUBLE LIFT "DYNAMIC" BLOCK

This Block possesses the invaluable quality of not "**running down**" whilst the load is suspended.



Having two hooks, the time of lowering is saved. The Lifting Chain travels only at same speed as weight lifted, hence there is but little wear on the Pulleys. The parts are interchangeable.

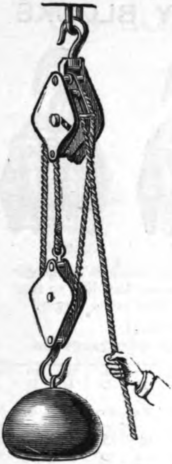


Tested to	Price Block	Lift Chain with two Hooks and Hand Chain.
5 cwts.	£0 16 0	1/6 per foot lift
10 "	1 4 0	2/- " "
20 "	1 12 0	2/3 " "
40 "	2 8 0	2/9 " "

In ordering state height of lift.
In case of repairs' quote number of Block and letter cast or stamped on the required part.

TANGYES' "SELF-SUSTAINING" ROPE PULLEY BLOCK

(Hewitt and Goff's Patent)



In this Block there is no abrasive action on the rope, which is merely slightly compressed by the brake.

To lower. Pull down the hand rope an inch or two, which will release the brake, then allow the rope to run freely through the hand.

This Block is similar in form and construction to the London Pattern Rope Pulley Block, see page 126.

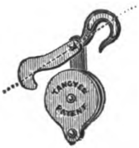
In ordering state height of lift.

Diam. Sheave ... ... ins. Width Groove ... ... "	2½ ⅜	3½ ½	4 ⅝	4¾ ¾	5 ⅞	6 1
Pair 1 and 1 Sheave Blocks ... Best Rope per foot lift	**8/6** -/2	**10/-** -/3½	**11/6** -/4½	**14/6** -/5	**17/6** -/7	**20/-** -/10
Pair 1 and 2 Sheave Blocks ... Best Rope per foot lift	**9/6** -/3	**11/6** -/4½	**13/-** -/6	**16/6** -/7½	**21/-** -/10	**24/-** 1/1
Pair 2 and 2 Sheave Blocks ... Best Rope per foot lift	**10/6** -/3	**13/6** -/5½	**15/-** -/7	**19/-** -/10	**25/-** 1/-	**27/6** 1/5½
Pair 2 and 3 Sheave Blocks ... Best Rope per foot lift	**12/-** -/3½	**14/6** -/6	**17/-** -/9½	**21/-** 1/-	**27/6** 1/2	**31/-** 1/8
Pair 3 and 3 Sheave Blocks ... Best Rope per foot lift	**13/-** -/4	**15/-** -/7½	**18/6** -/10½	**23/-** 1/2	**29/6** 1/3	**34/-** 2/-
Pair 3 and 4 Sheave Blocks ... Best Rope per foot lift	**14/-** -/5	**16/6** -/8½	**20/-** -/11	**26/-** 1/4	**34/-** 1/8	**40/-** 2/3
Pair 4 and 4 Sheave Blocks ... Best Rope per foot lift	**15/-** -/6	**17/6** -/10	**21/6** 1/2	**30/-** 1/6	**38/-** 1/10	**45/-** 2/8

TANGYES'

WROUGHT-IRON ROPE PULLEY BLOCKS

(London Pattern.)

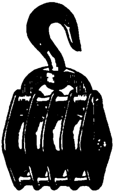

Snatch No. 1

Snatch No. 1a

Nº 3.

Nº 4.

Nº 5.


Nº 6.

The Eye, as shown in No. 4, is supplied with the smallest Block of each pair ordered. The actual width of groove is from 1/16 to ⅛ more than list, so that the 16 × 3¼ is really 16 × 3⅜, and so on, to allow for new rope being larger.

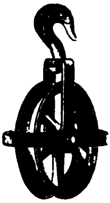
These Blocks have turned shafts, bright pulleys, and are bored.
The Cross-heads are made of wrought-iron. All parts are interchangeable.

Diam. Sheave … **Width Groove** …	ins. 2½ × ⅜	ins. 3½ × ½	ins. 4 × ⅝	ins. 4¾ × ¾	ins. 5 × ⅞	ins. 6 × 1	ins. 7 × 1¼	ins. 8 × 1½	ins. 9 × 1¾	ins. 10 × 2	ins. 11 × 2¼	ins. 12 × 2½	ins. 14 × 2¾	ins. 15 × 3	ins. 16 × 3¼
Snatch No. 1 … Weight … … lbs.		3/9 4	4/6 5	5/3 8	7/6 11	9/- 14	11/- 21	14/- 31	21/6 44	42/- 62	50/- 91	75/- 109	95/- 152	115/- 211	145/- 249
Snatch No. 1a … Weight … … lbs.		4/6 4	5/3 6	6/6 9	8/9 11	10/3 16	12/6 23	16/- 33	24/- 46	45/- 66	60/- 93	84/- 120	105/- 164	130/- 219	160/- 260
1 Sheave … … Weight … … lbs.	2/6 1	3/- 4	3/9 5	5/3 9	6/6 12	7/6 16	9/6 22	12/6 35	20/- 47	30/- 66	45/- 92	60/- 118	80/- 170	100/- 225	115/- 350
2 Sheaves … … Weight … … lbs.	3/6 2	5/- 5	5/9 8	7/3 13	9/6 20	11/- 26	16/- 35	22/6 56	32/- 74	50/- 105	90/- 156	105/- 222	126/- 296	150/- 412	175/- 504
3 Sheaves … … Weight … … lbs.	4/6 3	5/9 7	7/3 10	9/6 18	12/6 25	14/6 35	21/- 49	30/- 75	45/- 104	70/- 144	115/- 214	140/- 292	170/- 416	200/- 586	240/ 695
4 Sheaves … … Weight … … lbs.	6/- 5	6/9 10	9/- 14	13/- 23	17/3 38	20/- 49	30/- 68	42/6 104	65/- 145	95/- 208	140/- 289	165/- 390	200/- 550	260/- 760	300/- 880
Spare Iron Sheaves } ea.	-/3	-/4	-/6	-/10	1/3	1/6	2/6	3/6	4/6	6/-	8/-	10/-	14/-	17/-	20/-
Brass Sheaves, ea.	1/-	1/6	2/3	3/6	5/-	6/6	8/9	12/9	19/3	32/-					
Blocks will take Chain } ins.				3/16	¼	5/16	⅜	7/16	½	9/16	⅝	11/16	¾	13/16	⅞

For Brass Sheaved Blocks, add price of Brass Sheaves, less that of Iron Sheaves.
For Galvanizing these Blocks, add 20 °/ₒ to above prices.

TANGYES'

GIN BLOCKS OR RUBBISH PULLEYS



GIN BLOCK

Diam. Pulley ... ins.	2½	3½	4	4¾	6	7	8	9
Width Groove ... "	⅜	½	⅝	¾	1	1¼	1	1
Weight .... lbs.	1	1¾	2½	4¾	10½	13½	13	14
Price...............each	3/-	3/3	3/6	4/-	4/6	5/-	5/6	6/-
Spare Sheaves ... "	-/3	-/4	-/6	-/10	1/-	1/3	1/6	1/9
Diam. Pulley ... ins.	10	11	12	14	16	18	20	22
Width Groove ... "	1	1	1	1¼	1½	1½	1½	1½
Weight .... lbs.	16	18	22	31	45	50	58	67
Price...............each	6/6	7/6	8/3	9/-	12/-	14/-	17/-	19/-
Spare Sheaves ... "	2/-	2/3	2/9	3/9	5/6	6/-	7/6	8/9

WROUGHT-IRON ROPE PULLEY BLOCKS

TABLE GIVING "TEST" LOADS

Diam. Sheave ... ins. Width Groove ... "	2½ × ⅜	3½ × ½	4 × ⅝	4¾ × ¾	5 × ⅞	6 × 1	7 × 1¼	8 × 1½	9 × 1¾	10 × 2	11 × 2¼	12 × 2½	14 × 2¾	15 × 3	16 × 3¼
Cwts. per Sheave ...	1	3	5	7	10	12	18	27	35	48	60	75	90	105	120

RULE :—

$$\frac{\text{Load}}{\text{"Test" Load per Sheave}} = \begin{array}{l}\text{number of Sheaves}\\ \text{and size of Blocks}\end{array}$$

EXAMPLE :—

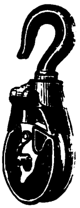
A pair of 3 and 3 Sheave, ⅞ in., at 10 cwt. per Sheave } will test to
Or, " 2 3 " 1 " " 12 " " " } 60 cwts.

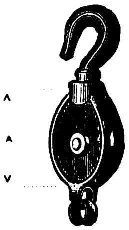
For a slight extra charge Blocks can be tested before leaving our Works.

NOTE.—We do not bind ourselves to the exact powers given above, but they are approximately correct. In ordering, it is always advisable to leave a sufficient margin.

TANGYES'

MALLEABLE SHIP PULLEY BLOCKS





These Blocks are well finished, and being galvanized, are not liable to rust.

The frames and sheaves are of malleable iron. The hooks and pins of best Staffordshire wrought-iron.

They are carefully proportioned to give strength with lightness.

The hooks swivel, and each block is fitted with eye and thimble.

Size of Block (A) ... ins.	4	5	6	7	8	10	12
Diam. Sheave ... ... "	2½	3½	4⅛	5	6	7½	9
To take Rope circumference "	2	2¼	2½	3	3¼	4	5
Snatch	7/-	9/-	12/-	14/6	18/9	24/3	34/9
Weight ... ... lbs.	3	6	9	11¼	14	20	34
1 Sheave	5/-	6/-	7/9	9/6	12/-	18/3	26/9
Weight ... ... lbs.	2¼	4½	7	9	12½	27	32
2 Sheave...	5/6	8/-	10/6	12/9	19/3	30/3	40/3
Weight ... ... lbs.	4¼	7	10½	13½	19½	42	50
3 Sheave...	7/6	10/-	14/-	18/3	24/9	40/3	53/-
Weight ... ... lbs.	5¾	9	14½	19½	26	52	70
Spare Malleable Sheaves, each	6d.	9d.	1/1	1/9	2/4	3/9	4/3
Brass Sheaves ... ... "	10d.	1/6	2/3	3/3	4/4	7/3	8/9
Blocks will take Chain ... ins.	...	...	3/16	¼	5/16	⅜	½

For Brass Sheaved Blocks, add price of Brass Sheaves less that of Iron Sheaves.

*On the side plate of each Block is cast the size (*A,*) and circumference of rope it will take.*

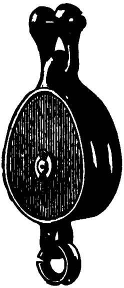
For wrought-iron Pulley Blocks, see page 126.

TANGYES'

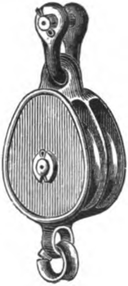
MALLEABLE SHIP PULLEY BLOCKS

GALVANIZED

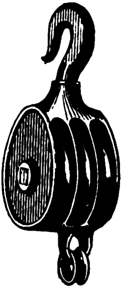
As supplied to H.M. Government.



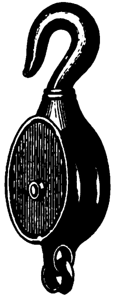
Class A



Class C



Class D



Class E

Class A has Solid Cast Eye (reverse,) and Shackle.
" **C** " " and Shackle.
" **D** has wrought-iron Standing Hook, for peak and throat halyards.
" **E** " . Swivel Hook for engine room.

Size of Block ... ins.	4	5	7	8	10	12	14
Diam. Sheave ... ... "	3	3½	5	6	7½	9	10
To take Rope circumference "	1½	2	2½	3	3½	4½	5
CLASSES A and C							
1 **Sheave**	4/3	6/6	9/9	14/-	19/3	30/-	43/-
2 "	5/6	9/6	14/-	20/6	32/-	46/-	...
3 "	6/9	11/6	17/9	25/-	43/-	...	...
CLASSES D and E							
1 **Sheave**	4/6	6/3	9/9	11/-	17/9	30/3	...
2 "	5/6	8/9	11/6	18/3	39/6	62/-	...
3 "	6/9	11/-	17/3	26/6	46/-	...	...

On the side plate of each Block is cast the size and circumference of rope it will take.

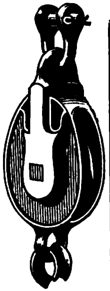
TANGYES'

MALLEABLE SHIP PULLEY BLOCKS

GALVANIZED

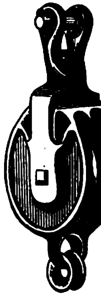
As supplied to H. M. Government.

CLASSES O and P



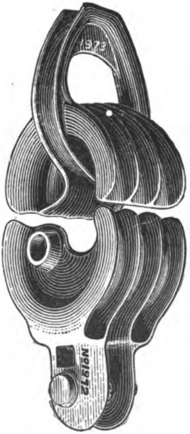
CLASS O

Size of Block ... ins.	...	5	7	8	10
Diam. Sheave ... "	...	3½	5	6	7½
To take Rope circum. "	...	2	2½	3	3½
1 **Sheave**	...	...	18/-	35/-	44/6
2 "	...	...	21/6	39/6	62/-
3 "	...	...	...	...	75/6
Size of Block ... ins.	12	14	16	18	20
Diam. Sheave ... "	4½	5	7	7½	9
To take Rope circum. "	9	10	12	13½	15
1 **Sheave**	61/-	84/3	124/6	138/-	207/6
2 "	88/-	118/9	152/6	210/6	...
3 "	110/6	162/3	...	...	...



CLASS P

Class O has wrought-iron Binding Strap, Eye (reverse,) and Shackle.
" **P** " " " and Shackle.



MALLEABLE SHIP DEAD-EYES

GALVANIZED

New design, as supplied to H. M. Government.

	STEEL WIRE SHROUD		LANYARD		Price per pair
	Size	Diam. Served	Size	Diam.	
No. 1	2 ins.	⅞ ins.	3 ins.	1⅛ ins.	19/-
" 2	2¼ "	1 "	3½ "	1¼ "	24/-
" 3	2½ "	1⅛ "	4 "	1⅜ "	32/-
" 4	2¾ "	1¼ "	4½ "	1⅝ "	38/-
" 5	3 "	1⅜ "	5 "	1¾ "	50/-
" 6	3½ "	1½ "	5½ "	1⅞ "	70/-
" 7	4 "	1⅝ "	6 "	2⅛ "	114/-
" 8	4½ "	1⅞ "	6½ "	2¼ "	158/-

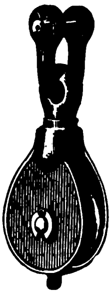
Each number consists of a pair of Dead Eyes, i.e., one upper and one lower.

TANGYES'

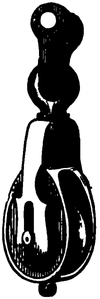
MALLEABLE SHIP CLUMP BLOCKS

GALVANIZED

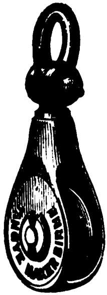
As supplied to H.M. Government.



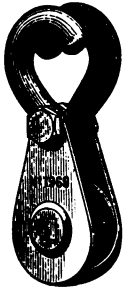
CLUMP S



CLUMP T



CLUMP V



CLUMPS W & X

Clump S has Swivel Eye and Shackle for Trusses for Lower Yard.
" **T** " Wrought-iron Binding and Shackle for ditto.
" **V** " Jews' Harp Shackles for Port Runners.
" **W** " Calliper Hook, and Eye in Bolt for Down Hauler.
" **X** " " " but no Eye in Bolt.

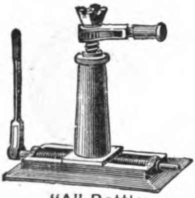
Size Clump ...	ins.	5	6	6	7	7	8	8	9	9	10	12
Diam. Sheave ...	...	3½	4¼	3½	4½	4¼	5½	5	5½	5½	6⅞	8¼
To take Chain...	ins.	5/16	5/16	⅜	7/16	½	½	9/16	5/16	11/16	¾	⅞
Clump S ...	...	...	18/3	17/6	19/3	25/-	...	29/6	...	...	...	...
" **T** ...	...	...	...	...	...	...	...	...	63/6	66/-	98/3	131/3
" **V** ...	...	9/9	...	...	...	...	...	...	...	...	...	...

CLUMPS W AND X

Size Clump	... ins.	4	5	6	7	8
Diam. Sheave	... "	2¼	2 9/16	3⅜	3 15/16	4½
To take Chain	... "	¼	5/16	⅜	7/16	½
Clump W	...	36/6	46/-	53/9	63/3	74/3
" **X**	...	34/-	42/-	50/-	58/-	69/-

On the side plate of each Block is cast the size and circumference of rope it will take.

TANGYES' SCREW LIFTING JACKS



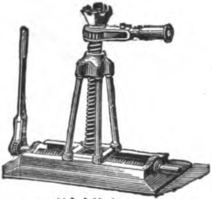
"A" Bottle Traversing Jack

BOTTLE TRAVERSING JACK "A"

Wrought-iron Case

Tons	Diam. Elevating Screw	Height when down	Length Traverse	PRICE £	s.	d.
	ins.	ins.	ins.	£	s.	d.
8	2¼	20	6½	3	2	0
10	2⅜	24	9	3	12	0
12	2⅜	24	12	3	18	0
15	2½	26	12	4	7	0
18	2¾	27	16	6	0	0
20	3	27	22	6	19	0

Top Nut if of Brass—Extra

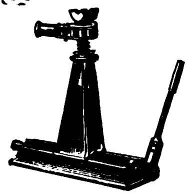


"AA" Leg Traversing Jack

LEG TRAVERSING JACK "AA"

Top and Bottom Nuts of Brass

Tons	Diam. Elevating Screw	Height when down	Length Traverse	PRICE £	s.	d.
	ins.	ins.	ins.	£	s.	d.
8	2¼	20	6½	3	6	0
10	2⅜	24	9	4	0	0
12	2⅜	24	12	4	6	0
15	2½	26	12	4	18	0
18	2¾	27	16	6	16	0
20	3	27	22	8	4	0



"AAA" Steel Case Traversing Jack

STEEL CASE TRAVERSING JACK "AAA"

New Design—Registered

Tons	Diam. Elevating Screw	Height when down	Length Traverse	PRICE £	s.	d.
	ins.	ins.	ins.	£	s.	d.
8	2¼	20	6½	2	18	0
10	2⅜	24	9	3	5	0
12	2⅜	24	12	3	10	0
15	2½	26	12	3	15	0
18	2¾	27	16	5	10	0
20	3	27	22	6	10	0

N.B.—This Jack may be had with Brass Case, instead of steel, at an extra price.

TANGYES' SCREW LIFTING JACKS

"B" WOOD HALEY JACK

The Worms and Wheels are of Hammered Iron, case hardened.

Wood Case

Tons	Diam. Screw	Height when down	PRICE		
	ins.	ins.	£	s.	d.
2	1¾	28	2	6	0
4	2	30	2	17	0
6	2¼	31	3	5	0
8	2½	33	4	0	0
10	2¾	33	4	8	0
12	3	35	5	12	0
16	3½	38	8	12	0
20	4	41	11	0	0

"BA" IRON HALEY JACK

The Worms and Wheels are of Hammered Iron, case hardened.

Tons	Diam. Screw	Height when down	PRICE		
	ins.	ins.	£	s.	d.
2	1¾	25	2	15	0
4	2	26	3	6	0
6	2¼	28	3	17	0
8	2½	30	4	13	0
10	2¾	31	5	5	0
12	3	33	6	15	0
16	3½	35	9	15	0
20	4	38	12	5	0

Steel Case

WINDLASS JACKS

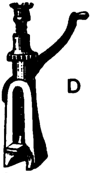
"C" SINGLE PURCHASE

Steel Case

Tons	Diam. Screw	Height when down	PRICE		
	ins.	ins.	£	s.	d.
5	2	30	3	5	0
8	2⅛	31	3	9	0
10	2¼	32	3	10	0

"D" DOUBLE PURCHASE

Tons	Diam. Screw	Height when down	PRICE		
	ins.	ins.	£	s.	d.
8	2¼	31	4	19	0
10	2½	32	5	13	0
12	2¾	34	6	12	0



Steel Case

"F" TRIPOD WINDLASS JACK

Steel Case

Tons	Diam. Screw	Height when down	PRICE		
	ins.	ins.	£	s.	d.
5	2	32	3	0	0
8	2⅛	33	3	7	0
10	2¼	33	3	10	0

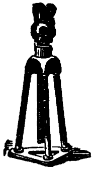
"G|" RATCHET BOTTLE JACK

Tons	Diam. Screw	Height when down	PRICE		
	ins.	ins.	£	s.	d.
5	2	17	0	19	6
6	2⅛	20	1	1	0
8	2¼	23	1	16	0
10	2⅜	26	2	2	0
12	2½	30	2	9	0
15	2¾	33	2	18	0

Steel Case

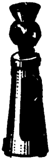
TANGYES' SCREW LIFTING JACKS

H



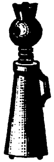
TRIPOD JACK
Brass Nut

HA



TRIPOD-BOTTLE JACK
Steel Case
New Design registered, combining advantages of both Tripod and Bottle Jack

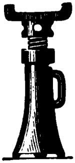
I



BOTTLE JACK
Steel Case
(14 to 20 Ton have wrought-iron cases)

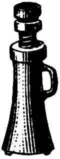
Tons	Diam. Screw	Height down	PRICE H	PRICE HA	PRICE I	Tons
	ins.	ins.	£ s. d.	£ s. d.	£ s. d.	
2	1½	9	0 12 9	0 8 0	0 8 0	2
3	1¾	12	0 14 6	0 9 6	0 9 6	3
4	1⅞	15	0 19 6	0 13 0	0 13 0	4
5	2	18	1 4 0	0 15 0	0 15 0	5
6	2⅛	21	1 9 0	0 19 6	0 19 6	6
8	2¼	24	1 14 6	1 2 6	1 2 6	8
10	2⅜	27	2 4 0	1 9 6	1 9 6	10
12	2½	30	2 11 0	1 14 0	1 14 0	12
14	2¾	33	3 0 0	……	2 15 0	14
16	3	36	3 10 0	……	3 6 0	16
18	3¼	42	5 0 0	……	6 0 0	18
20	3½	48	6 0 0	……	7 0 0	20

K



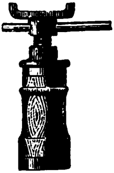
CAPE WAGON JACK
Cast-Iron Case

KA



BOTTLE JACK
Cast-Iron Case

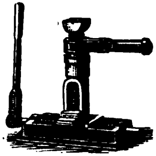
L



CAPE WAGON JACK
Wood Case

Tons	Diam. Screw	Height down	PRICE K	PRICE KA	PRICE L	Tons
	ins.	ins.	£ s. d.	£ s. d.	£ s. d.	
1½	1½	12	0 8 0	0 6 0	0 11 0	1½
2	1½	15	0 9 3	0 7 0	0 12 0	2
4	1¾	18	0 11 9	0 9 3	0 15 0	4
5	1¾	21	0 12 9	0 10 6	0 15 6	5
6	1⅞	24	0 16 0	0 13 9	0 18 9	6
8	2⅛	24	0 19 0	0 16 3	1 1 6	8
10	2⅜	24	1 2 0	0 19 3	1 3 6	10

TANGYES' SCREW LIFTING JACKS



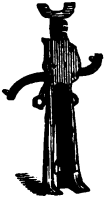
TRAM-CAR TRAVERSING JACK

Steel Case

To lift at head and foot

Tons	Diam. Elevating Screw	Height when down	Length Traverse	PRICE		
	ins.	ins.	ins.	£	s.	d.
6	2	15½	6½	3	13	0
12	2¼	18	9	4	6	0

Height of Foot from ground in 6-ton size is 3½ inches; in 12 ton size, 4 inches.

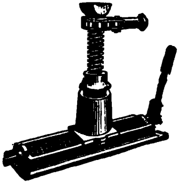


RACK AND PINION JACK

Steel Case

The Pinions and Wheels are of Hammered Iron, case hardened

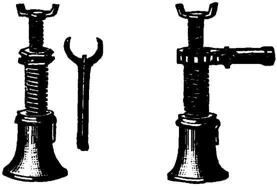
Purchase	Tons	Height when down	PRICE		
		ins.	£	s.	d.
Single	3	30	3	9	0
Single	4	30	4	0	0
Double	8	32	6	3	0
Double	10	32	7	4	0



SHEWARD'S
TELESCOPE TRAVERSING JACK

Cast-iron Case—Steel Nut

Tons	Diam. Elevating Screw	Height when down	PRICE		
	ins.	ins.	£	s.	d.
10	2½	16	7	10	0
15	2¾	18	10	0	0
20	3	20	12	0	0



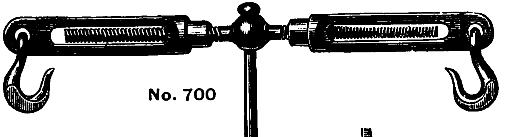
BALL'S
TELESCOPE JACKS

Cast-iron Case—Steel Nut

Tons	Diam. Small Screw	Height when down	PRICE Telescope Jack			PRICE Ratchet Telescope Jack		
	ins.	ins.	£	s.	d.	£	s.	d.
3	1⅜	11	1	8	0	1	17	0
4	1½	12½	1	13	0	2	5	0
5	1⅝	15½	1	17	6	2	8	0
6	1¾	20	2	7	0	2	15	0

TANGYES'

SCREW COUPLINGS, BRAKE & RIGGING SCREWS, &c.



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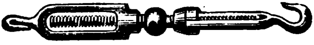

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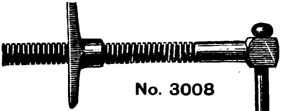

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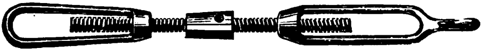

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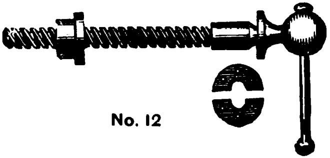

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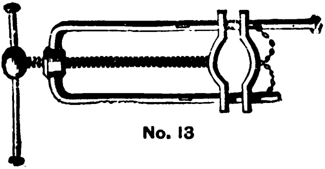

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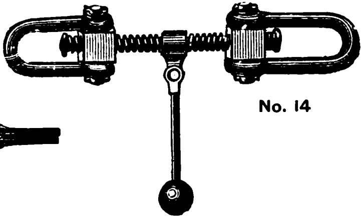

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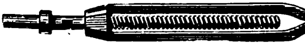


No. 785

TANGYES'

SCREW COUPLINGS, BRAKE & RIGGING SCREWS, &c.

STRETCHING SCREW, No. 700

Diam. Screw	Run out	Price
1 in. ...	16 ins.	55/-
1¼ " ...	16 "	90/-
1½ " ...	16 "	130/-

STRETCHING SCREW, No. 701

Diam. Screw	Run out	Price
¾ in. ...	10 ins.	15/-
1 " ...	10 "	20/-
1¼ " ...	10 "	30/-
1½ " ...	10 "	45/-

BRAKE SCREW, No. 3008

Diam. Screw	Length overall	Price
1 in. ...	18 ins.	7/9
1⅛ " ..	18 "	8/6
1¼ " ...	18 "	9/3
1½ " ...	18 "	12/9

UNION SCREW, No. 702

Diam. Screw	Run out	Price
¾ in. ...	10 ins.	15/-
1 " ...	10 "	18/-
1¼ " ...	10 "	22/-
1½ " ...	10 "	30/-

JOINERS' BENCH SCREW, No. 12

18 ins. × 1⅛ ins. ...	8/6
20 " × 1¼ " ...	9/6
22 " × 1½ " ...	10/9
24 " × 1¾ " ...	12/9

SKID SCREW, No. 785

Diam. Screw	Length Screw	Price
⅞ in. ...	15 ins.	6/6
1 " ...	15 "	7/6
1⅛ " ...	15 "	9/6
1¼ " ...	15 "	12/-

RIGGING SCREW, No. 13

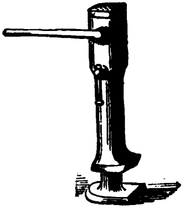
12 ins. long	9/-
14 "	10/-
16 "	11/6
18 "	12/6
20 "	14/-
22 "	16/-
24 "	19/-

RAILWAY SCREW COUPLING, No. 14

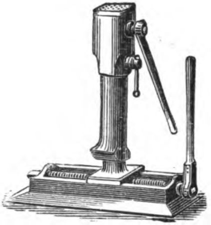
Of best iron, with Screw and Nut of best hammered scrap, Shackle 1⅛ in. diam., Screw 1¾ in. diam., Nut 3⅛ in. square, Breaking Strain about 27 tons, Weight about 54 lbs. 24/- each.

TANGYES' HYDRAULIC LIFTING JACK

Adopted by the British and many Foreign Governments, and most of the principal Railway Companies and Engineers in the World.



LIFTING JACK

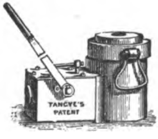


TRAVERSING JACK

This Jack is arranged so that one man can raise the specified weight.

Tested to	Height when down	Run out	Weight	Price Lifting	Price Traversing
3 tons	19 ins.	6 ins.	34 lbs.	£3 0	£6 0
4 "	23 "	10 "	57 "	4 0	7 0
6 "	24 "	10 "	68 "	4 10	8 0
8 "	26 "	11 "	76 "	5 10	9 0
10 "	27 "	12 "	86 "	6 0	9 10
12 "	27 "	12 "	96 "	6 10	10 0
15 "	28 "	12 "	104 "	7 0	11 10
20 "	28 "	12 "	132 "	8 0	12 10
30 "	29 "	12 "	174 "	10 0	16 0
40 "	29 "	11 "	206 "	12 0	19 0
50 "	29 "	11 "	264 "	14 0	25 0
60 "	29 "	10 "	364 "	16 0	27 0

TANGYES' HYDRAULIC SHIP JACK

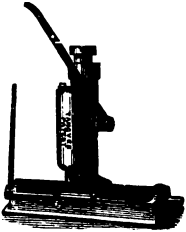


Tested to	Height when down	Run out	Cast-steel or Wrought-iron Cylinders
20 tons	12 ins.	6 ins.	£9 0
35 "	14 "	7 "	12 0
50 "	14 "	7 "	15 0
70 "	14 "	7 "	17 0
100 "	14 "	7 "	19 0
150 "	14 "	7 "	23 0
200 "	14 "	7 "	28 0

If with Safety Valve attached, 45/- extra.

TANGYES' HYDRAULIC LOCOMOTIVE JACK

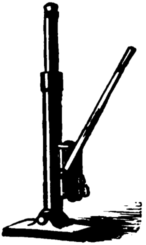
In this Jack the cylinder and cistern are in one.
The weights named can readily be raised by one man.



Tested to	Height when down	Run out	Traverse	Price
12 tons	20 ins.	12 ins.	12 ins.	£9 0
15 "	20 "	10 "	16 "	12 0
20 "	20 "	10 "	22 "	13 10

TANGYES' HYDRAULIC CARRIAGE LIFTER

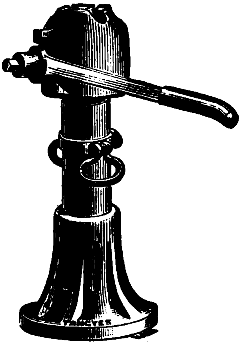
This Lifter is designed for raising the end of a Railway Carriage or Wagon to facilitate examination of axles, &c. The carriage can be raised about 2 feet in less than one minute by one man.



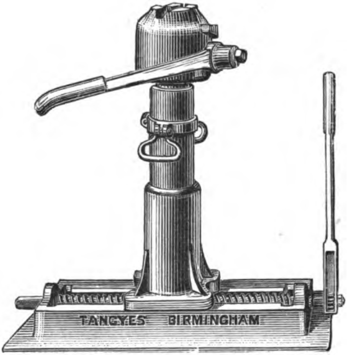
Tested to ... ... tons	2	4	6	8	10	12
Height when down, ins.	29	29	29	29	29	29
Run out ... ... "	20	20	20	20	20	20
Weight ... ... lbs.	84	90	100	112	146	160
Price ... ... £	6	7	8	9	12	15

TANGYES'

AMERICAN HYDRAULIC LIFTING JACK



LIFTING JACK



TRAVERSING JACK

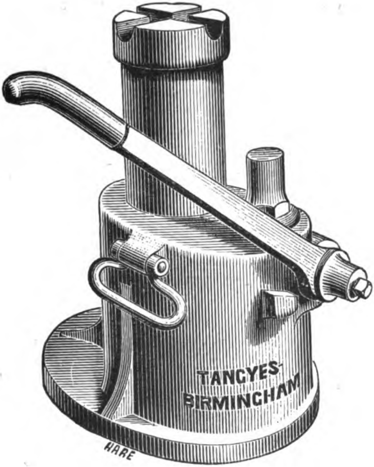
In lifting, it may happen that another stroke cannot be made, in which case the lever should be gently raised a little and pushed slowly down ; by this means a stroke will be missed.

To lower—withdraw the lever from the shaft to miss the lug, and press it gently down.

Tested to	Run out	**Price** Lifting	**Price** Traversing
7 tons	12 ins.	£10	£13
10 "	12 "	12	15
15 "	12 "	15	18
20 "	12 "	18	21
36 "	12 "	21	26
45 "	12 "	25	32
60 "	12 "	30	37

TANGYES'

AMERICAN HYDRAULIC LOCO JACK

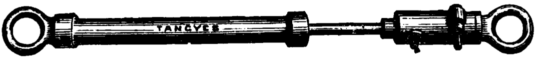


In lifting, it may happen that another stroke cannot be made, in which case the lever should be gently raised a little and pushed slowly down; by this means a stroke will be missed.

To lower—withdraw the lever from the shaft to miss the lug, and press it gently down.

Tested to	Ordinary Run out	Price	Telescopic Run out	Price
10 tons	9 ins.	£15	18 ins.	£20
15 "	9 "	17	18 "	24
20 "	12 "	20	24 "	28

TANGYES' HYDRAULIC PULLING JACK



In this Jack the Pump is inside and out of the reach of damage from accident.

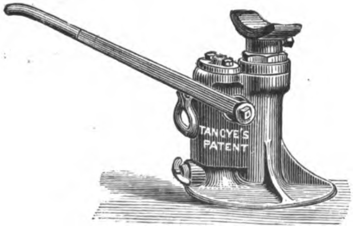
The run out can be increased to a moderate extent without increasing size of cylinder.

Tested to ... tons	2	4	6	8	10
Run out ... ... ins.	24	24	24	24	24
Weight ... ... lbs.	60	70	90	120	180
Price ... ... £	**9**	**11 10**	**14**	**16**	**18**
Extra run out, per ft.	60/-	60/-	70/-	80/-	80/-

INSTRUCTIONS FOR USING THE PULLING JACK.

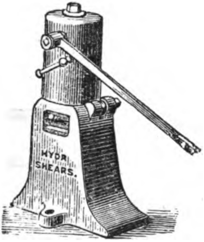
After filling it with water, which can be poured in through the air screw, suspend it with the cistern end downwards, screw up the stop valve and work the hand lever; the water will then be pumped from the cistern through the inner tube to the underside of the piston, thus impelling it forward, and at the same time the water from the back of the piston is constantly flowing through the passages indicated to supply the cistern. TO LOWER, open the stop valve when the water will return to the cistern.

TANGYES' HYDRAULIC TIMBER JACK



Tested to ...	4 tons
Height	14 ins.
Run out... ...	7 "
Weight	76 lbs.
Price	**£4**

TANGYES' HYDRAULIC SHEARS


HYDR SHEARS.

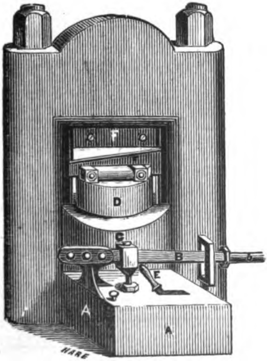
No.	To cut Iron square or round	To cut Iron Bar	Price
1	1½ ins.	3 × ½ ins.	£16 0
2	2 "	4 × ¾ "	21 10

Weight: No. 1,—230 lbs.; No. 2,—380 lbs.
Extra Shear Blades per pair, No. 1, £2, No. 2, £2 10.

These Shears can be adapted for power by attaching a joint pin to end of lever.

HYDRAULIC SHEARING MACHINE

(Eastwood's Patent)



No.	To cut Iron square or round	Price
1	2½ ins.	£42
2	3 "	50
3	3½ "	65
4	4 "	90

All with 10 *ins. gap, and two Pumps.*

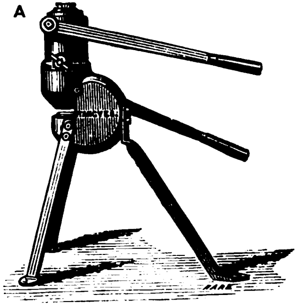
If made with separate Pump to be worked by power, extra.

If mounted on wheels, extra.

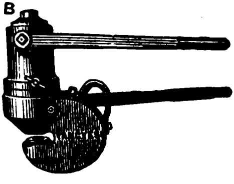
TANGYES' HYDRAULIC PUNCHING BEAR

OPEN MOUTH.

A



B



This Bear is made in two forms, viz., with legs as **A**, or with handle instead of legs, as **B**. The latter is largely used by Ship-builders, for punching ship frames, &c.

Distance from centre of punch to back of gap is 1¾ ins. For extra depth of gap special quotation is necessary.

No.	To punch	Through Iron Plate	Weight	Price
1	¾ in.	½ in.	64 lbs.	£7 10
1A	13/16 "	⅝ "	90 "	9 0
2	1 "	¾ "	120 "	10 10
3	1¼ "	1 "	320 "	21 0
4	1 "	steel rails	320 "	34 0

Price includes one Round Punch and Die.

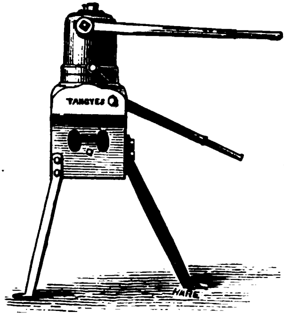
PUNCHES AND DIES FOR HYDRAULIC AND SCREW BEARS

To Punch Hole ... in.	½	¾	¾	13/16	⅞	1	1¼	1½
Through Iron Plate "	¼	⅜	½	⅝	⅝	¾	1	1
Round ... per pair	4/-	5/-	5/6	6/-	6/6	7/-	7/6	10/-
Oval or Square "	8/-	10/-	11/-	12/-	13/-	14/-	15/-	20/-

A Pair means One Punch and One Die.
Intermediate sizes charged at price of next larger size.

TANGYES' HYDRAULIC PUNCHING BEAR

CLOSE MOUTH.



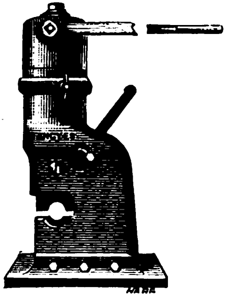
For Iron or Steel Rails, Girders, &c.

This Bear is made to suit any section of rail. In ordering, send a piece of the rail or a full-sized sectional sketch.

No.	To punch	Through Iron Plate	Price
1	¾ in.	½ in.	£12
2	1 "	¾ "	17
3	1¼ "	1 "	28
4	1 "	steel rails	38

Price includes one Round Punch and Die.

TANGYES' HYDRAULIC STEEL CABLE SHEARS



This Tool was specially designed for cutting Steel Cables, which it does very effectively, making a clean cut. It may be used also for Shearing Iron Bars in the usual way.

No.	To Cut Iron Bar	To Shear Steel Cable	Price
1	2 ins. × ½ in.	1¼ in. diam.	£28
2	3 ins. × ¾ in.	2 in. "	35

Price includes one pair Blades.
Extra Shear Blades per pair, No. 1 £2; No. 2 £2 10s.

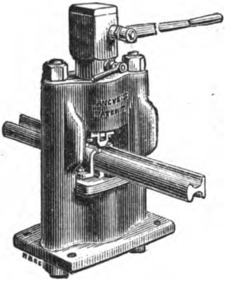
PUNCHES AND DIES FOR HYDRAULIC AND SCREW BEARS

To Punch Hole ... in.	½	¾	¾	13/16	⅞	1	1¼	1½
Through Iron Plate "	¼	⅜	½	⅝	⅝	¾	1	1
Round ... per pair	4/-	5/-	5/6	6/-	6/6	7/-	7/6	10/-
Oval or Square "	8/-	10/-	11/-	12/-	13/-	14/-	15/-	20/-

A Pair means One Punch and One Die.
Intermediate sizes charged at price of next larger size.

TANGYES'

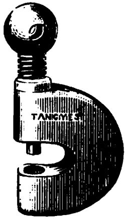
STANDARD HYDRAULIC PUNCHING MACHINE



No.	Gap	To punch	Through Iron Plate	Weight	Price
1	8 ins.	1 in.	⅞ in.	4 cwts.	£25
2	12 "	1 "	1 "	7 "	30
3	21 "	1 "	1 "	10 "	38

Price includes one Round Punch and Die.

TANGYES' SCREW PUNCHING BEAR



No.	To punch	Through Iron Plate	Weight	Price
1	½ in.	¼ in.	23 lbs.	40/-
2	¾ "	⅜ "	36 "	50/-
3	13/16 "	⅝ "	51 "	75/-

Price includes one Round Punch and Die.

If with Ratchet Lever, extra 12/-
" Plain " " 3/-

PUNCHES AND DIES FOR HYDRAULIC AND SCREW BEARS

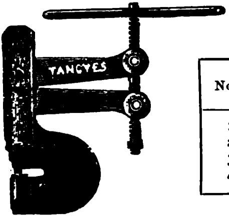
To Punch Hole … … … ins.	½	¾	¾	13/16	⅞	1	1¼	1½
Through Iron Plate … … "	¼	⅜	½	⅝	⅝	¾	1	1
Round … … … … per pair	4/-	5/-	5/6	6/-	6/6	7/-	7/6	10/-
Oval or Square … … "	8/-	10/-	11/-	12/-	13/-	14/-	15/-	20/-

A pair means one Punch and one Die.
Intermediate sizes charged at price of next larger size.

TANGYES'

"DUPLEX" LEVER PUNCHING BEAR

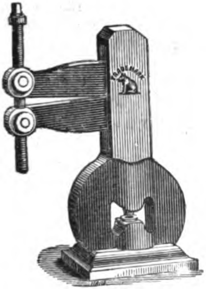
This Bear is now made almost entirely of Steel



OPEN MOUTH DUPLEX BEAR

No.	To punch	Through Iron Plate	Gap	Weight	Price
1	½ in.	¼ in.	1⅛ ins.	18 lbs.	£3 10
2	¾ "	⅜ "	1½ "	36 "	4 10
3	13/16 "	⅝ "	2 "	81 "	6 10
4	⅞ "	⅝ "	2⅛ "	120 "	10 10

Price includes one Round Punch and Die.



CLOSE MOUTH DUPLEX BEAR

No.	To punch	Through	Price
1	1½ in.	¾ in. Iron Rail	£17 10
2	1¼ "	½ " Steel "	

Price includes one Round Punch and Die.

PUNCHES AND DIES FOR HYDRAULIC AND SCREW BEARS

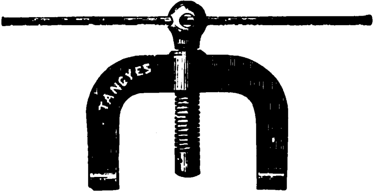
To Punch Hole ... ... in.	½	¾	¾	13/16	⅞	1	1¼	1½
Through Iron Plate ... ... "	¼	⅜	½	⅝	⅝	¾	1	1
Round ... ... per pair	4/-	5/-	5/6	6/-	6/6	7/-	7/6	10/-
Oval or Square ... ... "	8/-	10/-	11/-	12/-	13/-	14/-	15/-	20/-

A pair means one Punch and one Die.
Intermediate sizes charged at prices of next larger size.

TANGYES'

SCREW RAIL BENDER, OR "JIM CROW"

Made of best hammered Scrap Iron. Machine-cut Square Thread Screw.



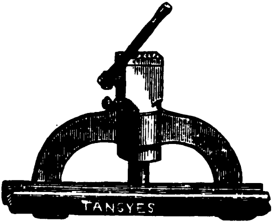
Size ... ... No.	1	2	3	4
Price ... ... £	2 10	3 10	5 0	7 0
Diameter of Screw	2 ins.	2¼ ins.	2½ ins.	2¾ ins.
Span	16 "	20 "	24 "	24 "
To bend Iron Rails up to, pr. yd.	30 lbs.	50 lbs.	90 lbs.	..
" " Steel Rails " "	20 "	45 "	65 "	90 lbs.
Weight ... ... approx.	60 "	96 "	140 "	180 "

This Bender can be made to suit any section of Tram Rail.

TANGYES'

HYDRAULIC RAIL BENDER, OR "JIM CROW"

Made of best hammered Scrap Iron. Can be worked in any position.



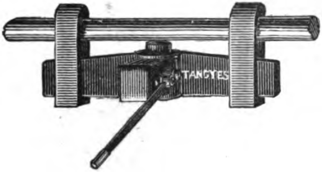
Size	A	B	C
Price ... ... £	7	9	11
To bend Iron Rails up to ... ...per yard	50 lbs.	90 lbs.	...
" " Steel Rails " ... ... "	45 "	65 "	90 lbs.
Weight ... ... approx.	100 "	150 "	200 "

This Bender can be made to suit any section of Tram Rail.
When ordering, a section of the rail should be sent.

TANGYES'

HYDRAULIC SHAFT STRAIGHTENER

For Straightening Shafts in the Lathe.



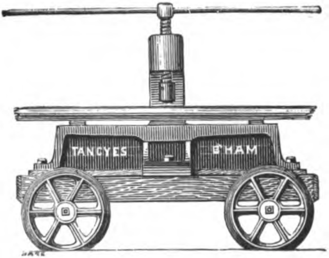
A bar passing through an eye in each of the Straps, not shewn in engraving, is supplied for convenience of lifting the machine, by means of Pulley Blocks, on and off the Lathe.

Diam. Ram.	Will take Shafts	Weight	Price
3½ ins.	3 ins. diam.	2 cwts.	£16
5 "	4 "	3½ "	22
6½ "	5 "	6 "	30

Price includes Straps.

TANGYES'

IMPROVED RAIL STRAIGHTENER

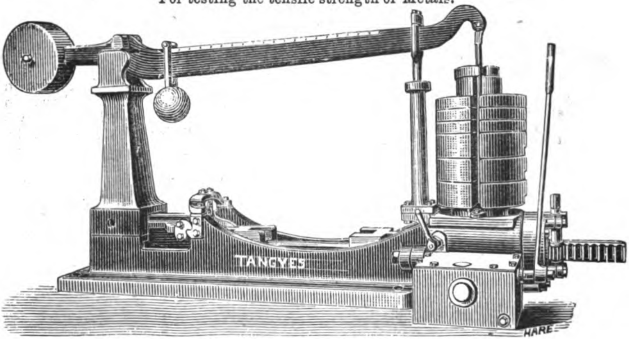


No.	To bend Steel Rails	To bend Iron Rails	Price
1	45 lbs. per yd.	60 lbs. per yd.	£18
2	90 " "	90 " "	25

In ordering state gauge of rails or if required for roads.

TANGYES' HYDRAULIC TESTING MACHINE

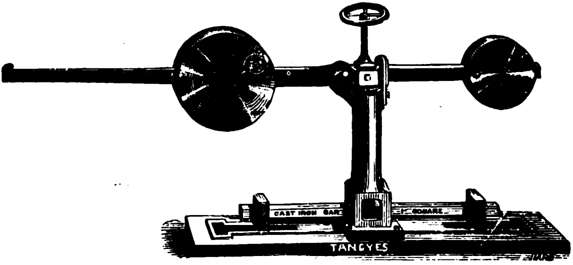
For testing the tensile strength of Metals.



To Test up to ... ... tons	25	50	100
Price, including a set of Clips £	75	150	250
Clips per set	30/-	40/-	60/-
Ultimate Extension Indicator £	15	20	25

In ordering say whether for round, square, or other section Iron.
Above can be marked to suit weights of foreign countries.

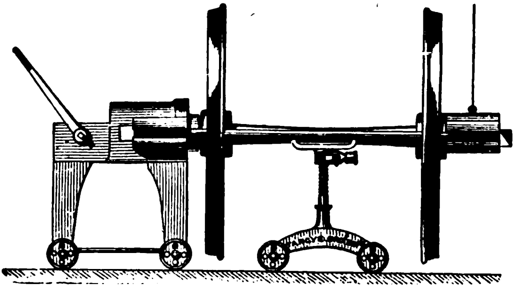
TANGYES' DEAD WEIGHT TRANSVERSE TESTING MACHINE



No.	To Test	Cast-iron Bars to	Weight	Price
1	10 cwts.	1 in. sq. at 3 ft. centres	4¼ cwts.	£12 10
2	40 "	2 in. × 1 in. at 3 ft. centres	5½ "	20 0

TANGYES' HYDRAULIC WHEEL PRESS

For forcing Railway Carriage, Wagor, and Locomotive Wheels on and off their axles.



Size	Diam. Ram	Run out	Power	Weight	With 2 Pumps
A	7 ins.	9 ins.	50 tons	12 cwts.	£40
B	9 "	9 "	75 "	23 "	45
C	10 "	18 "	100 "	50 "	90
D	12 "	18 "	150 "	75 "	110
E	12 "	18 "	200 "	— "	120

Hydraulic Pressure Gauge, £3 3 extra.

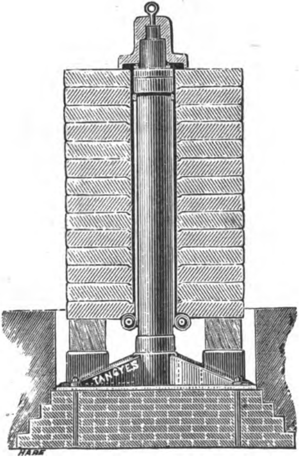
The C, D, and E sizes are generally as shown in illustration, and are for Locomotive Wheels. They consist of powerful Press with Cylinder and Ram, Windlass draw-back gear, pair gun-metal pumps in cast-iron cistern, with stop and safety valves, mounted on four wheels. Also two cross-heads, wrought-iron tension bars, and ratchet screw elevator, on four wheels. These sizes are arranged to take off one and put on two Locomotive Wheels at a time.

The A and B sizes are for carriage and wagon wheels, and are somewhat differently arranged, having Screw Drawback, no Elevator, and one Crosshead only. They put on or take off one wheel at a time.

If made for Wheels with Solid Wood Centres, No. A £5, and No. B £10, extra.

TANGYES'

IMPROVED HYDRAULIC ACCUMULATOR



The Accumulator consists of a strong cast-iron, or steel, cylinder, stepped into a heavy foundation plate, wrought-iron, steel or cast-iron, ram, carrying a heavy cast-iron head, to which is suspended, by means of strong wrought-iron bolts, a cast-iron plate, which supports the plates forming the load, these latter surround the ram and protect it from grit, dust, &c.

The fittings include safety valve, trip valve, stop rods, and stop plate.

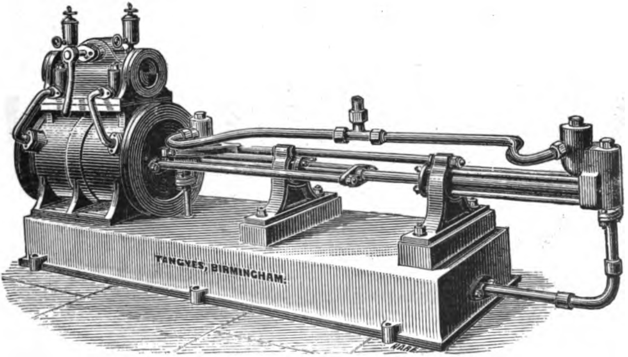
Quotations on receipt of necessary particulars.

For the "Special" Direct-action Accumulator Pump, see pages 153 *to* 155.
For Hydraulic Pressure Pumps, see pages 156 *to* 159.

TANGYES' "SPECIAL"

CROSS-HEAD HYDRAULIC PRESSURE PUMP

For Working Accumulators, Hydraulic Presses, Testing Pipes, &c., &c.


TANGYES, BIRMINGHAM.

In many cases the above dispenses with an Accumulator, as it will run at a high speed and automatically "slow down" as the pressure increases, thus avoiding danger to Hydraulic Presses or other machinery inseparable from the use of an Accumulator where a long fall will suddenly develop a largely increased strain, and at times burst either press or pipes.

This Pump is specially suited for requirements where it is necessary that the pressure upon the material be maintained for a lengthened period, as it continues to work at such a slow speed as merely supplies leakage, and so makes up for the "give" of the material.

Diam. Steam Cyl., ins.	9	10	12	14	16	18	18	21
" **Plungers** "	¾	1	1	1¼	1½	1½	1¾	2
Length Stroke ... "	9	12	12	18	18	18	18	24
Gallons per hour	110	200	200	310	450	450	620	800
Pressure in lbs. per sq. **A**	3700	2600	3700	3200	2800	3700	2700	2800
in. with 40lbs. steam **B**	4900	3400	4900	4200	3700	4900	3500	3750
Diam. Steam Inlet... ins.	1½	1½	2¼	2½	3	3	3	3½
" Exhaust Outlet "	1¾	2	2½	3	3½	3½	3½	4

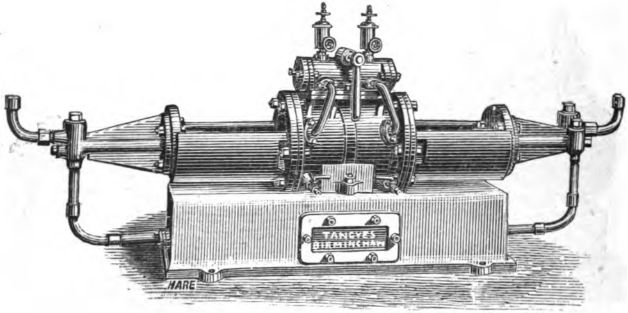
A. These are the pressures at which the pumps will run delivering approximately, the quantities stated in table. **B.** Are the pressures for which the pump is suitable when working a Hydraulic Press, and at which it will nearly pull up.

The above and other sizes quoted for on application.

TANGYES'

"SPECIAL" HYDRAULIC PRESSURE PUMP

For working Accumulators, Hydraulic Presses, Testing Pipes, &c., &c.



In many cases the above dispenses with an Accumulator, as it will run at a high speed and automatically "slow down" as the pressure increases, thus avoiding danger to Hydraulic Presses, or other Machinery, inseparable from the use of an Accumulator, where a long fall will suddenly develop a largely increased strain and at times burst either Press, or Pipes.

This pump is specially suited for requirements where it is necessary that the pressure upon the material be maintained for a lengthened period, as it continues to work at such a slow speed as merely supplies leakage and so makes up for the "give" of the material.

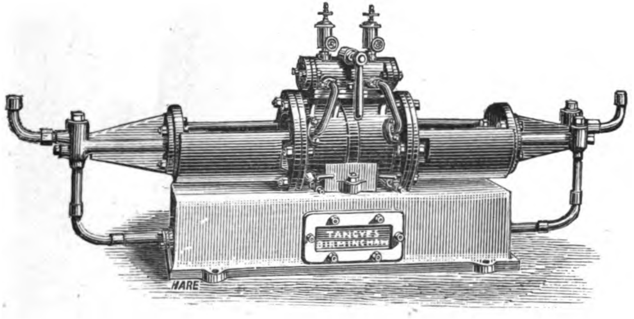
Diam. Steam Cyl., ins.	9	10	12	14	16	18	18	21
" Plungers ... "	¾	1	1	1¼	1½	1½	1¾	2
Length Stroke ... "	9	12	12	18	18	18	18	24
Gallons per hour	110	200	200	310	450	450	620	800
Pressure in lbs. per sq. in. with 40 lbs. steam A	3700	2600	3700	3200	2800	3700	2700	2800
Pressure in lbs. per sq. in. with 40 lbs. steam B	4900	3400	4900	4200	3700	4900	3500	3750
Diam. Steam Inlet... ins.	1½	1½	2¼	2½	3	3	3	3½
" Exhaust Outlet "	1¾	2	2½	3	3½	3½	3½	4

A. These are the pressures at which the Pumps will run, delivering approximately the quantities stated in table. **B.** Are the pressures for which the pump is suitable when working a Hydraulic Press, and at which it will nearly pull up.

The above and other sizes quoted for on application.

TANGYES'

"SPECIAL" HYDRAULIC PRESSURE PUMP



This arrangement is for lighter pressures than that shown on page 154, but the description given there applies equally to this.

The Pumps are made strong enough for pressure up to 2000 lbs. per sq. inch

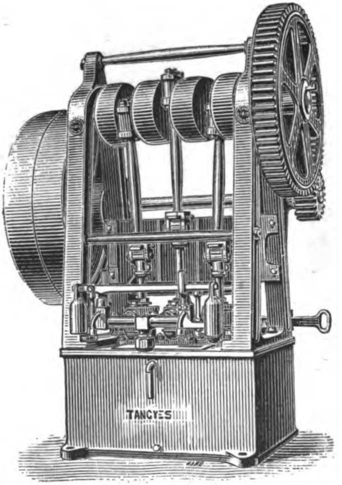
Diam. Steam Cyl., ins.	**8**	**8**	**10**	**12**	**12**	**14**	**14**	**16**	**18**	**18**	**21**	**21**
" **Plungers ...** "	**1½**	**2**	**2**	**2**	**2½**	**2½**	**3**	**3**	**3**	**3½**	**3½**	**4**
Length Stroke ... "	**12**	**12**	**12**	**12**	**18**	**18**	**18**	**18**	**18**	**18**	**24**	**24**
Gallons per hour	455	810	810	810	1270	1270	1840	1840	1840	2500	2500	3260
Pressure in lbs. per sq. in. with 40 lbs. steam	720	410	650	930	600	800	550	700	930	670	930	710
Diam. Steam Inlet... ins.	1½	1½	1½	2¼	2¼	2½	2½	3	3	3	3½	3½
" Exhaust Outlet "	1¾	1¾	2	2½	2½	3	3	3½	3½	3½	4	4
" Pump Pipes... "	1	1¼	1¼	1¼	1½	1½	2	2	2	2¼	2¼	2½

The above and other sizes quoted for on application.

TANGYES'

GEARED HYDRAULIC PRESSURE PUMP

As designed for H.M. Government.



This arrangement consists of three best gun-metal Pumps and Plungers, Double Safety Valve and connections for Hydraulic Pipe; strong Side Frames, with wrought-iron Stretchers, carrying a steel three-throw Crank Shaft, running in best gun-metal bearings; wrought-iron Connecting Rods, fitted with brasses and guides; First Motion Shaft, with fast and loose pulleys and striking gear, and Spur Pinion, working in spur mortice wheel, keyed on crank shaft; Cistern 38 ins. long by 28 ins. wide and 20 ins. deep.

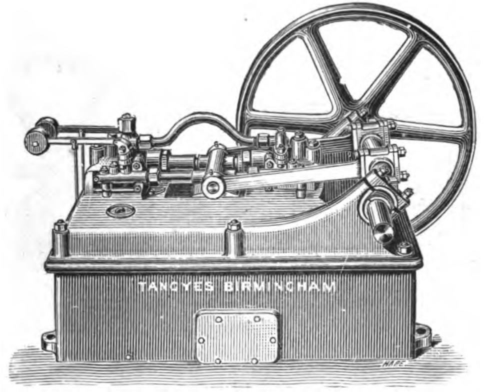
The Pumps are capable of throwing from 120 gallons per hour, at a pressure of 2 tons per square inch, to 370 gallons per hour, at a pressure of 15 cwts. per square inch.

Price £250.

TANGYES'

POWERFUL HYDRAULIC PRESSURE PUMP

On Cistern.



This arrangement consists of two or four best gun-metal Plunger Pumps, mounted on a strong cast-iron base plate, cast in one with the main chairs; Crank Shaft and Connecting Rods of hammered iron; all bearings of best gun-metal; Safety Valve and Pulley.

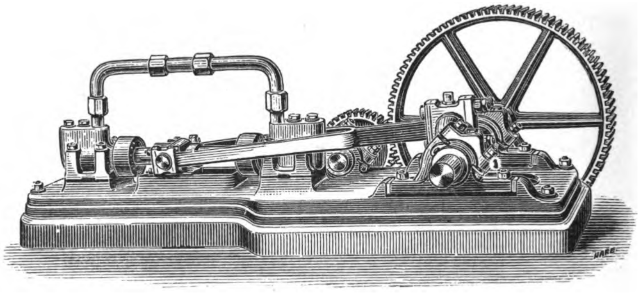
The Cistern measures 55½ ins. long by 31½ ins. wide, and 15 ins. deep inside.

No. 1.	Set of Quadruple Pumps similar to illustration, but with Spur Wheel and Pinion and extra Shaft, having two 1⅜ in. and two 3 in. Plungers, 6 ins. stroke, capable of throwing 200 gallons per hour at a pressure of 2 tons per square inch, or 1100 gallons at 400 lbs. per square inch.	£140
No. 2.	Set of Quadruple Pumps similar to illustration, with two 1 in. and two 3 in. Plungers, 6 in. stroke, capable of throwing 100 gallons per hour at a pressure of 2 tons per square inch, or 1000 gallons at 400 lbs. per square inch.	£125
No. 3.	Set of Double Pumps, having one each 1 in. and 3 in. Plungers, 6 in. stroke, capable of throwing 50 gallons per hour at a pressure of 2 tons per square in., or 500 gallons at 400 lbs. per square in.	£110

TANGYES'

POWERFUL HYDRAULIC PRESSURE PUMP

Without Cistern.



This arrangement consists of two best Gun-metal Plunger Pumps, Forged Crank Shaft and Connecting Rod, heavy Cast-iron Base Plate. All Bearings of best gun-metal. The Pump Crank Shaft is geared to Counter Shaft, and latter can either be coupled to Main Shaft of a Steam Engine, or provided with fast and loose Pulleys.

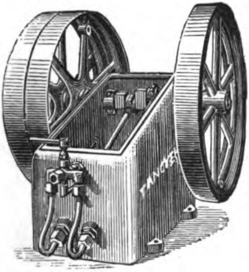
Pressure per square in.	Diam. Plungers	Revolutions per min.	Gallons per min.	Price
40 cwts.	1 in.	50	1·7	£32
30 "	1¼ "	50	2·6	33
20 "	1½ "	45	3·4	35
10 "	2 "	40	5·4	35

The Gearing shown in illustration is not included in prices; quotations given on receipt of necessary particulars.

TANGYES'

DIAGONAL HYDRAULIC PRESSURE PUMP

For Steam Power.



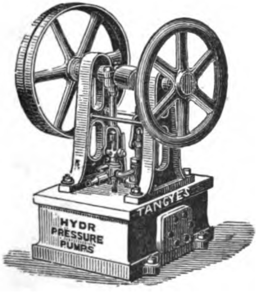
Set of DOUBLE Pumps—viz., one each 1 in. and 2 in., to give a pressure of 2 tons per sq. in. for working Presses, &c.	£42
Set of TREBLE Pumps—viz., one each 1, 1½, and 2 in., to give a pressure of 2 tons per square inch.	£60

Can be made with plungers of equal sizes for uniform pressure at same prices.

TANGYES'

HYDRAULIC PRESSURE PUMP

For Steam Power.

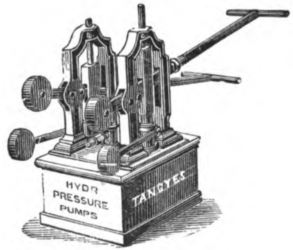


Set of DOUBLE Pumps—viz., one each 1in. and 2in., to give a pressure of 2 tons per sq. in. for working Presses, &c.	£45
Set of TREBLE Pumps—viz., one each 1, 1½, and 2 in., to give a pressure of 2 tons per square inch.	£65

Can be made with plungers of equal sizes for uniform pressure at same prices.

TANGYES' HYDRAULIC PRESSURE PUMP

For Hand Power.

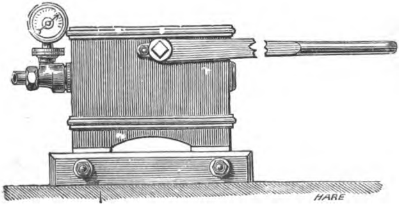


With one 1 inch Pump to give a pressure of 2 tons per square inch.	£22
With two Pumps as illustration, viz., one each 1in. and 2in., to give a pressure of 2 tons per square inch.	£30

TANGYES' HYDRAULIC PRESSURE PUMP

For Hand Power.

Best Gun-metal Pumps and Valves, enclosed in Cast-iron Cistern, for pressure of 2 tons per square inch.

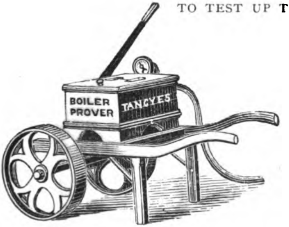


No. 1, with one 1in. Pump	£10 10
No. 2, with one 1in. and one 2in. Pump	£16 0

Hydraulic Gauge, £3 3s. extra.
Safety Valve, instead of Gauge £2 5s. extra.

TANGYES' BARROW BOILER PROVER

TO TEST UP TO 200 LBS. PER SQUARE INCH.

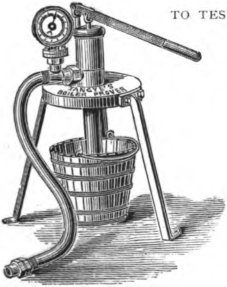


Price	£14	10
If without Barrow ...	12	10

Can be made for greater pressures at an extra charge.

TANGYES' TRIPOD BOILER PROVER

TO TEST UP TO 200 LBS. PER SQUARE INCH.



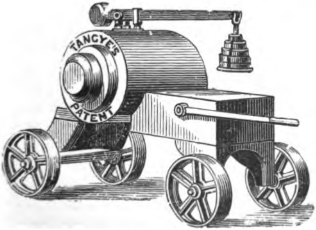
Price	£8 0 0
Weight	56 lbs.

The price includes flexible suction and delivery pipe, and brass connections.

Bucket shown in engraving not included in price.

TANGYES' HYDRAULIC GIRDER TESTER

With two Pumps.



Tested to	Diam. Ram	Run out	Weight	**Price**
Tons	ins.	ins.	cwts.	
50	8	10	8	£25
100	10	10	12	35
150	10	10	17	40
250	12	12	28	60

Hydraulic Pressure Gauge, £3 3s. extra.

TANGYES' HYDRAULIC PRESS

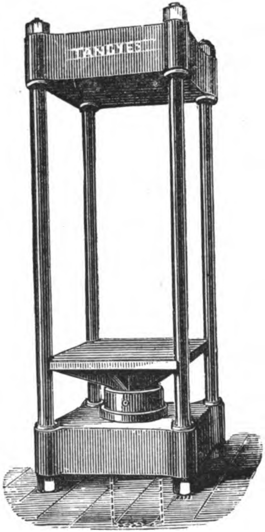


Fig. A.

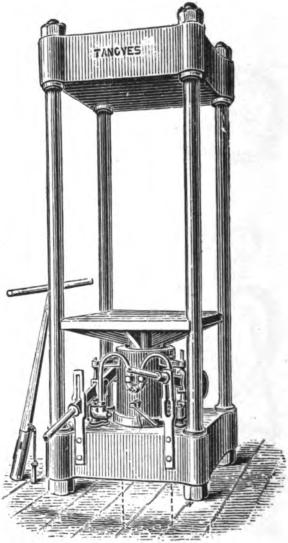


Fig. B.

Fig. A for Detached Hand or Steam Pumps.
" **B** has self-contained Cistern and Hand Power Pumps.

For Hand or Power Pressure Pumps, see pages 153 *to* 160.
For Accumulator, see page 152.

TANGYES' HYDRAULIC PRESS

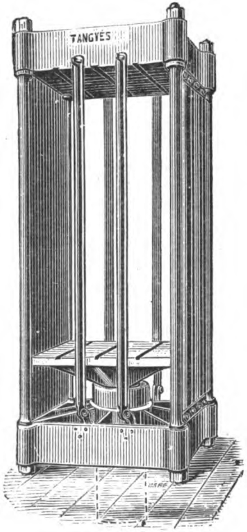
With or without Pumps.

As illustrated on page 162.

No.	Diam. Ram Ins.	Rise Ram Ins.	Power Tons	Distance between Table and Top when down Ins.	Distance between Pillars Ins.	Size of Table Ins.	Price without Pumps Fig. A	Price with Cistern in base and Pair Pumps Fig. B
1	6	15	50	42	30 × 30	46 × 30	£46	£71
2	6	24	50	54	" "	30 × 24	48	73
3	6	42	40	72	45½ × 37¼	49⅝ × 41⅝	65	80
4	6	54	40	84	" "	45 × 36	70	95
5	6	48	30	72	40½ × 40½	43¼ × 43	60	85
6	7	15	80	42	30¼ × 30¼	46 × 30	56	81
7	7	36	70	60	36 × 27¼	39¾ × 30¾	65	90
8	7	30	80	60	34 × 34	37¼ × 34	60	85
9	7	48	70	72	66 × 30	70½ × 34	105	130
10	7	60	70	84	39 × 27	39 × 27	90	115
11	7	60	70	84	45¾ × 30¾	46 × 30	98	123
12	7	36	80	60	34¾ × 28¼	32½ × 30½	70	95
13	8	42	60	84	45 × 37	45 × 36	85	110
14	8	48	150	72	66 × 30	66 × 30	170	195
15	8	48	100	72	36 × 24	36 × 24	90	115
16	8	48	100	72	39 × 33	39 × 39	95	120
17	8	18	100	24	" "	48 × 24	85	110
18	8	15	100	21	" "	24 × 21	75	100
19	8	12	100	34	" "	38 × 38	75	100
20	10	18	200	36	36 × 24	38 × 26	90	115
21	10	18	200	50	" "	" "	95	120
22	10	24	200	72	" "	" "	98	123
23	10	18	150	48	45¾ × 30	48½ × 32½	95	120
24	10	66	175	84	" "	" "	130	155
25	10	120	150	138	" "	41 × 17	180	205
26	10	20	200	64	48¼ × 42¼	48 × 42	130	155
27	10	108	200	126	" "	41 × 17	230	255
28	10	36	200	72	" "	60 × 42	160	185
29	10	36	200	72	" "	64 × 42	165	190
30	10	54	150	72	72¼ × 48¼	96 × 48	205	230
31	10	48	200	72	56½ × 44½	61 × 49	155	180
32	10	84	150	108	66 × 30	66 × 30	205	230
33	12	54	200	84	84 × 50	89¾ × 54½	245	270

TANGYES' HYDRAULIC PRESS

With Tee Iron Bars and Side Lining



This Press is for Baling Wool, Hay, Grass, Hides, &c., &c. It can be made with Cistern in Base and pair of Hand Power Pumps, as shown Fig. B., page 162.

For Hand or Power Pressure Pump, see pages 153 *to* 160.
For Accumulator, see page 152.

TANGYES' HYDRAULIC PRESS

With Tee Iron Bars and Side Lining

As illustrated on page 164.

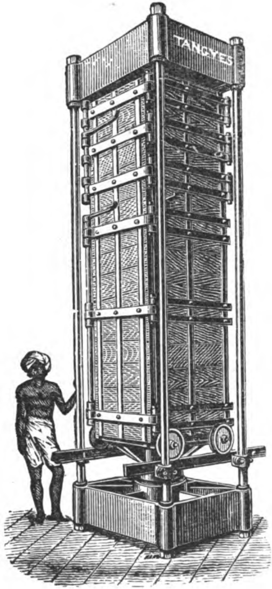
No.	Diam. Ram	Rise Ram	Power Tons	Distance between Table and top when down	Distance between Pillars	Size of Table	Price with Tee Iron Bars on all sides	Price with Cistern in Base and pair Pumps	If also with Plate Iron Lining on two sides, Extra
50	6 ins.	36 ins.	50	54 ins.	30 × 30 ins.	29 × 24 ins.	**£60**	**£85**	**£5**
51	6 "	42 "	50	60 "	36 × 24 "	35 × 24 "	**70**	**95**	**7**
52	6 "	48 "	40	72 "	45½ × 37¼ "	44 × 30 "	**78**	**103**	**9**
53	7 "	54 "	80	72 "	30¼ × 30¼ "	29 × 24 "	**90**	**115**	**8**
54	7 "	54 "	70	72 "	36 × 27¼ "	35 × 24 "	**85**	**110**	**8**
55	7 "	54 "	70	72 "	39 × 27 "	38 × 27 "	**100**	**125**	**10**
56	7 "	54 "	70	72 "	45¾ × 30¾ "	44 × 30 "	**110**	**135**	**10**
57	7 "	54 "	70	72 "	66 × 30 "	65 × 30 "	**130**	**155**	**10**
58	8 "	66 "	100	84 "	36 × 24 "	35 × 24 "	**110**	**135**	**10**
59	8 "	66 "	100	84 "	39 × 33 "	38 × 27 "	**120**	**145**	**12**
60	8 "	66 "	100	84 "	45 × 37 "	44 × 30 "	**110**	**135**	**12**
61	8 "	66 "	150	84 "	66 × 30 "	65 × 30 "	**200**	**225**	**12**
62	10 "	78 "	200	96 "	36 × 24 "	35 × 24 "	**150**	**175**	**12**
63	10 "	72 "	150	96 "	45¾ × 30 "	44 × 30 "	**155**	**180**	**13**
64	10 "	84 "	200	108 "	56½ × 44½ "	54 × 36 "	**200**	**225**	**16**
65	10 "	84 "	150	108 "	66 × 30 "	65 × 30 "	**230**	**255**	**15**

The rise of Ram and the distance between Table and Head can be varied to meet special requirements.

For Hand or Power Pressure Pumps, see pages 153 *to* 160.
For Accumulator, see page 152.

TANGYES' HYDRAULIC PRESS

With improved Portable Box.



The oak packing box shown has several advantages over those generally used :—

The 3 sides are firmly secured together, and one of them forms the back of top box. It can be run out clear of the Press even when doors are open. The boards are arranged horizontally, and the fastenings are disengaged simultaneously by a single lever for each box. A spare bottom is supplied to each so that the box can be re-filled while the bale is being hooped, thus saving time.

The Press can be made with Cistern in base and pair of Hand Power Pumps as shown Fig. B, page 162.
For Hand or Power Pressure Pumps see pages 153 *to* 160.
For Accumulator see page 152.

TANGYES' HYDRAULIC PRESS

With improved Portable Box.

As illustrated on page 166.

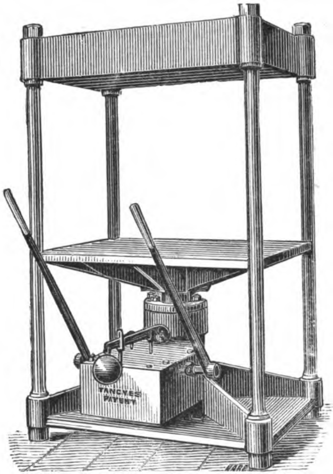
No.	Diam. Ram	Rise Ram	Power Tons	Distance between Table and Top when down	Distance between Pillars	Size of Table	Price Press minus pump	Price with cistern in base and pair pumps	Price box extra
80	6 ins.	48 ins.	50	72 ins.	30 × 30 ins.	30 × 18ins.	**£55**	**£70**	**£20**
81	6 "	48 "	50	72 "	30 × 30 "	36 × 18 "	**58**	**73**	**25**
82	7 "	54 "	80	72 "	30¼ × 30¼ "	30 × 18 "	**65**	**90**	**20**
83	7 "	48 "	70	72 "	36 × 27¼ "	30 × 24 "	**67**	**82**	**25**
84	7 "	66 "	80	84 "	30¼ × 30¼ "	36 × 18 "	**70**	**95**	**27**
85	7 "	60 "	70	84 "	36 × 27¼ "	36 × 24 "	**73**	**98**	**35**
86	8 "	66 "	100	84 "	36 × 24 "	30 × 18 "	**95**	**120**	**30**
87	8 "	60 "	100	84 "	39 × 33 "	30 × 24 "	**100**	**125**	**27**
88	8 "	78 "	100	96 "	36 × 24 "	36 × 18 "	**100**	**125**	**35**
89	8 "	72 "	100	96 "	39 × 33 "	36 × 24 "	**110**	**135**	**45**
90	8 "	78 "	100	96 "	36 × 24 "	42 × 18 "	**105**	**130**	**40**
91	8 "	72 "	100	96 "	39 × 33 "	42 × 24 "	**112**	**137**	**50**
92	8 "	90 "	100	108 "	36 × 24 "	48 × 18 "	**110**	**135**	**50**
93	8 "	84 "	100	108 "	39 × 33 "	48 × 24 "	**120**	**145**	**65**
94	10 "	90 "	200	108 "	36 × 24 "	36 × 18 "	**145**	**170**	**40**
95	10 "	84 "	150	108 "	45¾ × 30 "	36 × 24 "	**135**	**160**	**50**
96	10 "	120 "	200	138 "	36 × 24 "	41 × 17 "	**165**	**190**	**60**
97	10 "	102 "	200	120 "	36 × 24 "	42 × 18 "	**150**	**175**	**50**
98	10 "	84 "	150	108 "	45¾ × 30 "	42 × 24 "	**140**	**165**	**60**
99	10 "	108 "	200	126 "	36 × 24 "	48 × 18 "	**155**	**180**	**60**
100	10 "	102 "	150	126 "	45¾ × 30 "	48 × 24 "	**155**	**180**	**75**
101	10 "	102 "	150	126 "	45¾ × 30 "	54 × 24 "	**155**	**180**	**85**
102	10 "	102 "	150	126 "	45¾ × 30 "	60 × 30 "	**170**	**195**	**110**

The rise of Ram and distance between Table and Head can be varied to meet special requirements.

The Press can be made with Cistern in base and pair of Hand Power Pumps as shown Fig. B, page 162.
For Hand or Power Pressure Pumps see pages 153 *to* 160.
For Accumulator see page 152.

TANGYES' HYDRAULIC "PRINTERS'" PRESS

For Bookbinders, Printers, and others.

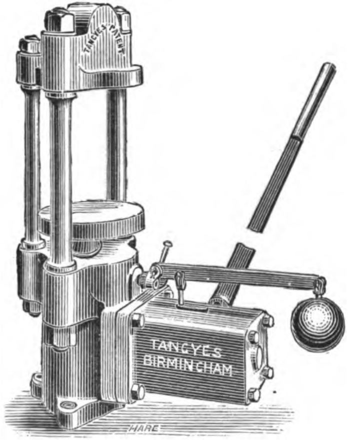


No.	Diam. Ram	Rise Ram	Power Tons	Distance between Table and Top when down	Distance between Pillars	Size of Table	Price with Cistern and one Pump on base
120	3 ins.	10 ins.	10	15 ins.	15½ × 10⅞ ins.	17½ × 13 ins.	£13
121	3 "	10 "	10	30 "	15½ × 10⅞ "	17½ × 13 "	15
122	3½ "	10 "	15	26 "	23⅞ × 20⅜ "	27½ × 23½ "	19
123	3½ "	10 "	15	40 "	23⅞ × 20⅜ "	27½ × 23½ "	20
124	3½ "	10 "	20	26 "	32¼ × 22 "	35⅝ × 25½ "	25
125	3½ "	10 "	20	40 "	32¼ × 22 "	35⅝ × 25½ "	26
126	3½ "	10 "	20	46 "	32¼ × 22 "	35⅝ × 25½ "	27
127	4 "	10 "	30	26 "	32¼ × 22 "	35⅝ × 25½ "	28
128	4 "	10 "	30	36 "	32¼ × 22 "	35⅝ × 25½ "	29
129	4 "	10 "	30	26 "	36¼ × 22 "	36 × 24⅜ "	31
130	4 "	10 "	30	33 "	36¼ × 22 "	36 × 24⅜ "	33
131	4 "	10 "	30	40 "	36¼ × 22 "	36 × 24⅜ "	34
132	6 "	12 "	50	42 "	24 × 18 "	24 × 18 "	40

With two Pumps, £5 extra.

TANGYES' HYDRAULIC "DENTIST" PRESS

For the use of Dentists, &c.



This Press consists of a strong cylinder and head united by steel screwed pillars, ram, gun-metal pressure pump, stop valve and hand lever.

It is suitable for the special requirements of Goldsmiths, Druggists, Dentists, &c., &c.

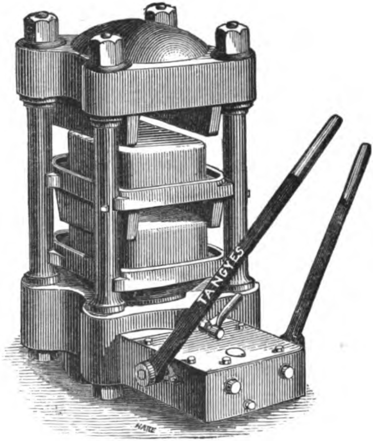
No. 150

Power ... ... tons	20
Diam. Ram... ... ... ins.	4
Length Stroke ... ... "	4
Between Platten and Head "	7
Diam. Platten ... ... "	8
Price ... ... £	15

TANGYES' HYDRAULIC "OIL" PRESS

(WITH PRESSING BOXES)

For Linseed, Cotton, Rape, Olive, Castor, and other oils.



This Press is easily worked by one man, and produces a good per centage of oil.

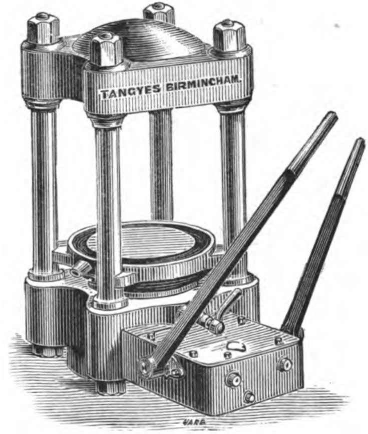
It consists of massive head and base, four wrought-iron screwed columns, cylinder, ram, pressing boxes, pair best gun-metal pumps in cistern, stop valve and working levers.

No.	Diam. Ram	Power Tons	Price with 2 Boxes	Price with 4 Boxes
160	10 ins.	150	£40	£50
161	12 "	200	50	60

Roller Mills, £8. **Seed Heaters, £8.**
Hair Clamps, £3. **Best Woollen Bags 4/-**

TANGYES' HYDRAULIC "OIL" PRESS

For Linseed, Cotton, Rape, Olive, Castor and other oils.


TANGYES BIRMINGHAM.

This Press is easily worked by one man, and produces a good per centage of oil.

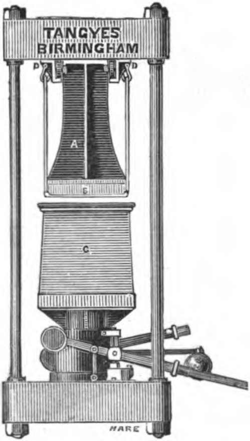
It consists of massive head and base, four wrought-iron screwed columns, cylinder, ram, round platten and drain pipe, pair best gun-metal pumps in cistern, stop valve and working levers.

No.	Diam. Ram	Power Tons	Price
170	10 ins.	150	£36
171	12 "	200	46

Roller Mills, £8. **Seed Heaters, £8.**

TANGYES' HYDRAULIC "TALLOW" PRESS

For Tallow, Greaves, &c.



This Press has a strong cast-iron box and false head. The box measures 36 × 26 × 24, and has a perforated lining. The false head has rollers for running it on one side when changing the box. Pair of best gun-metal pumps, safety and stop valves.

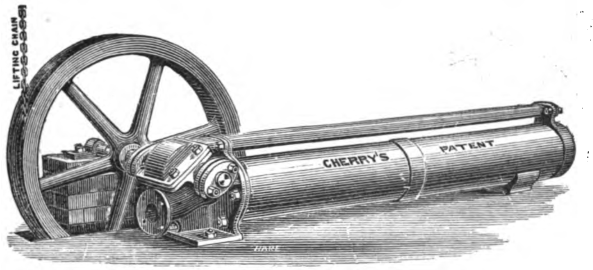
No. 180

Diam. Ram	Tested to	Weight	Price
6 ins.	50 tons	45 cwts.	£75

This Press may be had with Detached Pumps for hand or steam.

CHERRY'S PATENT HYDRAULIC HOIST

TANGYES LIMITED, SOLE MAKERS.



The distinctive feature of this hoist is the simple and direct method by which the motion of the piston is made to rotate the winding drum or pulley.

The working parts consist of a **Piston** to which is attached a **Steel Pitched Chain,** passing over a **Toothed Wheel** on the **Drum Shaft.**

The only other moving part is the Valve, the **Lever** of which controls the Starting, Stopping, and Lowering motions.

This hoist is in use for a great variety of purposes, and is particularly suited for employment where space is an object. It is used for "whipping" on board steam ships, where its quick and noiseless motion compares most favourably with the clattering noise of the ordinary steam winch.

Quotations on receipt of necessary particulars.

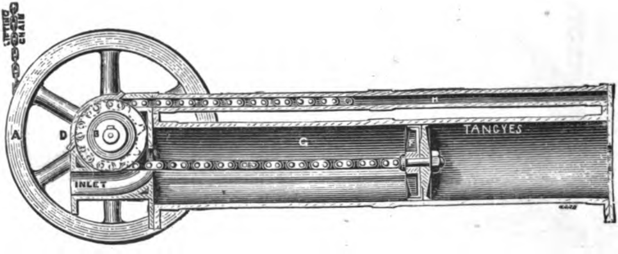
For section and explanation, see next page.

CHERRY'S PATENT

HYDRAULIC HOIST

TANGYES LIMITED, SOLE MAKERS.

General description of the working of Cherry's Steam and Hydraulic Hoist



In this section

F is a piston working in cylinder **G.**

E is a steel pitch chain attached to piston and passing over strong toothed wheel **B,** keyed on drum shaft **C.** The shaft passes through long stuffing boxes in the casing and carries the drum.

D is door for access to casing.

H is a guiding tube for free end of steel chain.

The action is as follows:

The valve, which controls the starting, stopping, and lowering motions, admits steam or water to the cylinder, and forces the piston **F** towards end of its stroke. The pitch chain thus causes the toothed wheel **B,** the shaft **G,** and winding drum to revolve. By opening same valve to exhaust, the steam or water is allowed to escape, and piston to return at any desired speed. It will be seen from this that the valve acts as an efficient brake when water is used, but, for steam, a strap brake is supplied.

In the double cylinder arrangement (not shown):

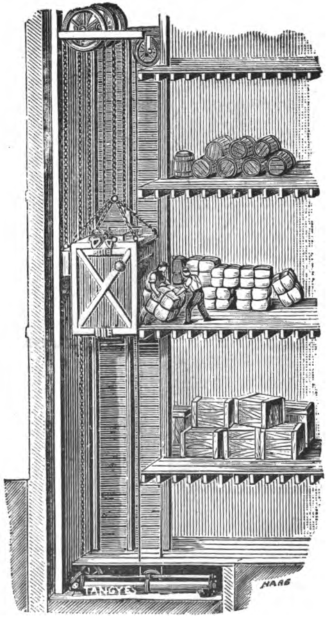
The two pistons are kept in equilibrium by the pressure from main on their upper sides, and if water be admitted to the lower end of either cylinder, the other being open to exhaust, the pistons rotate the drum shaft, as in the Single Hoist. The motions are all controlled by *one valve lever*, but when steam is the motive power a brake is necessary.

An advantage of the double cylinder is that one hook rises while the other descends, and it is specially suited for Sack Lifting, "Whipping," &c.

CHERRY'S PATENT

HYDRAULIC WAREHOUSE HOIST

TANGYES LIMITED, SOLE MAKERS.



The illustration represents the "Cherry" Patent as applied to Warehouse Lifts.

The Hoist is shown fixed below basement floor. It may, however, be bolted to the joists of ground floor, or fixed in any suitable position.

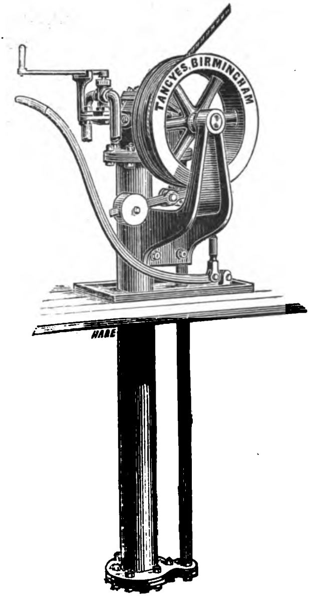
The pressure may be obtained from the Town Mains, or from a Special Steam Pump, see pages 48 and 49, or from Accumulator and Pumps, see pages 152 to 155.

Quotations on receipt of necessary particulars.

CHERRY'S PATENT

SHIP WHIPPING AND CARGO HOIST

TANGYES LIMITED, SOLE MAKERS.



This Hoist is also made with two Cylinders.

N.B.—The Cylinder may be placed horizontally upon or under the deck, or vertically in the hold.

CHERRY'S PATENT

SHIP WHIPPING AND CARGO HOIST

TANGYES LIMITED, SOLE MAKERS.

This is an application to Ships' purposes of the Hoist described on page 174.

The working parts consist of a **Piston**, to which is attached a **Steel Pitch Chain**, passing over a **Toothed Wheel** on the **Drum Shaft.**

The only other moving part is the **Lever**, which controls the starting, stopping and lowering motions.

The wear and tear, noise and vibration, of the ordinary Ships' Deck Winch is avoided in this arrangement, and the speed of working is found in practice to be equal to all requirements in the way of quick discharge.

For whipping, the Hoist can keep the largest practicable gang employed.

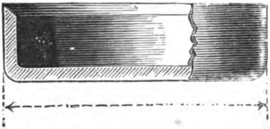
Diam. Cyl.	Tested to		Price
	With 40 lbs. Steam	With 60 lbs. Steam	
6 ins.	2½ cwts.	3½ cwts.	£40
7 "	3½ "	5½ "	45
8 "	5 "	7½ "	50
9 "	6½ "	10 "	55
10 "	8 "	12 "	60

Height of Lift 24 feet.

N.B.—The Cylinder may be placed horizontally upon or under the deck, or vertically in the hold.

TANGYES' BEST LEATHER PACKINGS

For Hydraulic Machinery.



CUP LEATHERS.

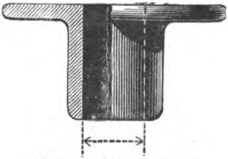
Size ... ins.	1	1¼	1½	1¾	2	2⅛	2¼	2⅜	2½	2⅝	2¾
Price each	-/6	-/7	-/8	-/8	-/9	-/9	-/10	-/10	1/-	1/-	1/-

Size ... ins.	3	3⅛	3¼	3⅜	3½	3¾	4	4¼	4½	4¾	5
Price each	1/-	1/-	1/2	1/2	1/3	1/5	1/6	1/6	1/8	1/8	2/-

Size ... ins.	5½	5¾	6	6¼	6½	7	7¼	7½	8	8½	9
Price each	2/-	2/2	2/6	3/-	3/3	3/6	3/9	4/-	4/3	4/6	5/3

Size ... ins.	10	10½	11	12	12¼	13	14	15	16	18	...
Price each	6/2	6/8	7/2	8/3	10/3	10/6	11/6	12/9	14/6	17/-	...

Moulds accurately turned and fitted, for making Cup Leathers, 10/- per inch diam.



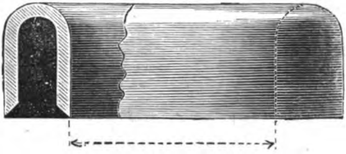
HAT LEATHERS.

Size ... ins.	⅜	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½	1⅝
Price each	-/5	-/6	-/7	-/7	-/8	-/9	-/9	-/9	-/10	-/10	1/-

Size ... ins.	1¾	1⅞	2	2⅛	2¼	2⅜	2½	2¾	3	...	...
Price each	1/-	1/-	1/-	1/5	1/6	1/7	1/8	1/10	2/-	...	...

TANGYES' BEST LEATHER PACKINGS

For Hydraulic Machinery.



U LEATHERS.

Size ... ins.	¾	1	1⅛	1¼	1⅜	1½	1⅝	1¾	1⅞	2	2⅛
Price each	1/8	1/9	1/10	1/10	2/-	2/-	2/-	2/-	2/2	2/2	2/3

Size ... ins.	2¼	2½	2⅝	2¾	3	3¼	3⅜	3½	3⅝	3¾	4
Price each	2/4	2/4	2/6	2/6	2/7	3/-	3/-	3/2	3/2	3/2	3/6

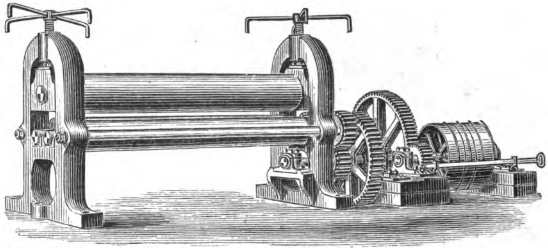
Size ... ins.	4¼	4½	4¾	5	5½	6	6½	7	7¼	7½	7¾
Price each	3/8	4/-	4/-	4/-	4/-	4/6	5/6	5/8	5/10	6/2	6/6

Size ... ins.	8	8¼	8½	8¾	9	9¼	9½	9¾	10	10½	11
Price each	6/6	6/6	6/6	6/6	6/6	6/8	6/10	6/10	7/8	7/8	7/8

Size ... ins.	12	12½	13	13½	14	15	16	18	19	21	24	30
Price each	8/8	13/2	13/2	14/-	14/-	14/9	16/-	19/3	20/-	21/6	28/6	52/6

Moulds accurately turned and fitted, for making Cup Leathers, 10/- per inch diam.

PLATE STRAIGHTENING & BENDING ROLLS



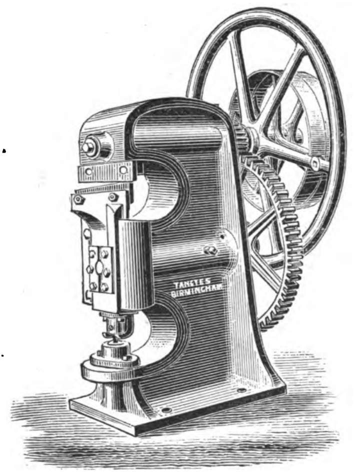
The above are suitable for Rolling complete rings; the top roll being easily removable.

The Rolls can be arranged for angle or T iron if required, at a slight extra cost.

The Price includes both Striking Gear and Foundation Bolts.

No.	To take plates	Thickness of plates rolled cold	Diam. of top roll	Diam. of bottom rolls	Approx. weight	Price	If Arranged to bend L or T iron, extra
1	6 ft. wide	⅜ ins.	10 ins.	8 ins.	105 cwt.	£145	£10 0 0
2	7 " "	⅜ "	10 "	8 "	115 "	155	10 0 0
3	7 " "	½ "	12 "	10 "	180 "	190	10 0 0
4	8 " "	½ "	13 "	10 "	195 "	205	15 0 0
5	9 " "	½ "	14 "	10½ "	210 "	220	20 0 0

PUNCHING AND SHEARING MACHINE

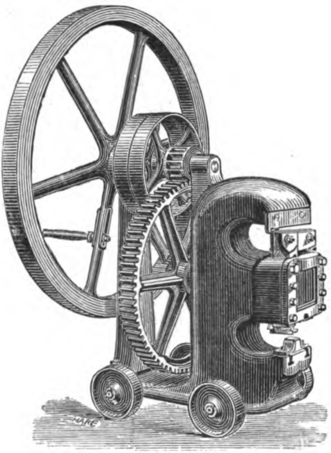


The Shear is placed at an angle for cutting off long bars.

No.	Will Punch Holes diam.	Through Iron Plates thick	Will Shear Iron Plates thick	Distance from Edge of Plate		Approx. Weight	Price
				Shears	Punch		
A	1 in.	1 in.	1 in.	13 ins.	16 ins.	95 cwts.	£110
B	¾ "	⅝ "	⅝ "	9 "	11 "	40 "	60
C	½ "	⅜ "	⅜ "	7 "	8 "	19 "	38
D	⅜ "	¼ "	¼ "	6 "	6 "	11 "	25

One Round Punch and Die included in price.

PUNCHING AND SHEARING MACHINE



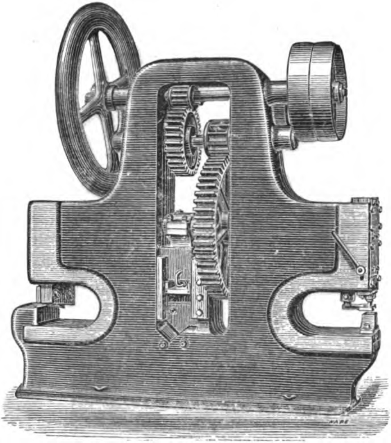
The Shear Blades are placed at an angle for cutting off long bars.

No.	Will punch holes diam.	Through Iron Plates thick	Will shear Iron Plates thick	Distance from edge of Plate		Approx. weight cwts.	To work by Power only	To work by Hand and Power	If mounted on four wheels extra
				Shears	Punch				
1	⅜ ins.	⅜ ins.	⅜ ins.	8 ins.	8 ins.	15	£30	£33	£2
2	⅝ "	½ "	½ "	10 "	8½ "	25	43	46	3
3	¾ "	⅝ "	⅝ "	11 "	12 "	32	55	58	3
4	¾ "	¾ "	¾ "	10 "	12 "	45	66	70	3
5	1 "	1 "	1 "	18 "	18 "	90	105	110	4

Punches and Dies to punch under any of the sizes named, extra.

Note—No. 5 *Machine is Double-geared.*

PUNCHING AND SHEARING MACHINE



With disengaging motion for punching, handle on each side, and disengaging motion for angle iron.

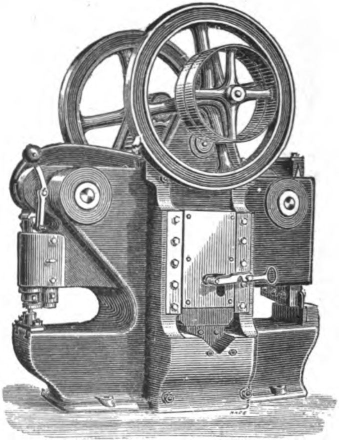
No.	Will punch holes diam.	Through iron plates thick	Will shear iron plates thick	Distance from edge of plate	Will shear angle iron	Approx weight without angle iron shears	Approx weight with angle iron shears	Price without angle iron shears	Price with angle iron shears	If with steam Engine extra
*0	¾ ins.	¾ ins.	¾ ins.	16 ins.	3×3×½	3 tons	3½ tons	£90	£102	...
1	1 "	1 "	1 "	14 "	4×4×⅝	5 "	5½ "	132	144	£20
2	⅞ "	⅞ "	⅞ "	18 "	4×4×⅝	5½ "	6 "	144	156	20
3	1¼ "	1¼ "	1¼ "	18 "	6×6×1	6¾ "	7¼ "	180	192	25
4	1 "	1 "	1 "	24 "	6×6×1	7¼ "	7¾ "	192	204	25

Punches and Dies to punch under any of the sizes named, extra.

* *This Machine has single power gearing.*

IMPROVED LEVER

PUNCHING AND SHEARING MACHINE



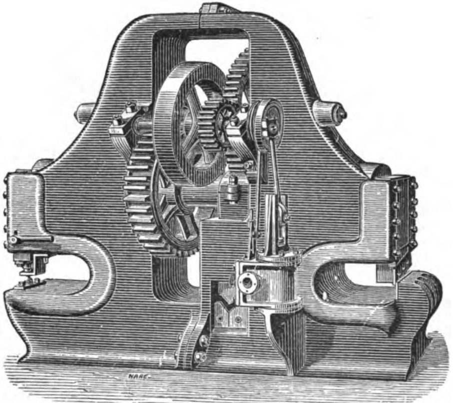
The Levers are worked by cams, which allow the slide to remain at the top during half the revolution, giving ample time for adjusting the plate for the next hole. This Machine can consequently be worked at a quicker speed than the ordinary Eccentric Machines.

With Disengaging Motion for punching and for angle iron.

No.	Will punch holes diam.	Through Iron Plates thick	Will shear Iron Plates thick	Distance from edge of Plate	Will shear Angle Iron	**Price** without Angle Iron Shears	If fitted with Angle Iron Shears extra
1	¾ ins.	¾ ins.	¾ ins.	14 ins.	3×3×½	£100	£20
2	1 "	1 "	1 "	18 "	4×4×⅝	180	25
3	1 "	1 "	1 "	24 "	4×4×⅝	220	25
4	1¼ "	1¼ "	1¼ "	24 "	6×6×¾	280	30
5	1½ "	1½ "	1½ "	30 "	6×6×1	360	30

Punches and Dies to punch under any of the sizes named, extra.

POWERFUL
PUNCHING AND SHEARING MACHINE



With disengaging motion for punching, handle on each side, and disengaging motion for angle iron.

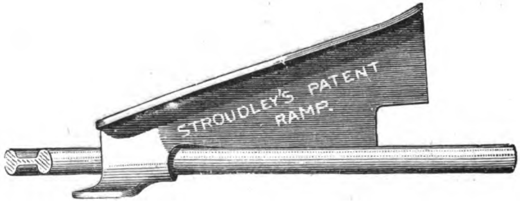
Will punch holes diam.	Through Iron Plates thick	Will shear Iron Plates thick	Distance from edge of Plate	Will shear angle Iron	Approx. weight with angle iron Shears and steam Cylinder	**Price** without angle Iron Shears	**Price** with angle Iron Shears	If with steam Engine, extra
1¼ ins.	1¼ ins.	1¼ ins.	26 ins.	6 × 6 × 1	15 tons	**£330**	**£350**	£30

Punches and Dies to punch under any of the sizes named. extra.

TANGYES'

IMPROVED STROUDLEY'S RAMPS

For Re-railing Rolling Stock



These Ramps greatly facilitate the placing of Rolling Stock on the Rail without injury to the Vehicles. They also lessen liability to accidents by the saving of time, and being light they are readily applied. They are supplied in sets of four, viz: two right hand, and two left hand Ramps. The illustration represents one right hand Ramp in position on the rails for re-railing a Carriage, Goods Wagon, or Locomotive.

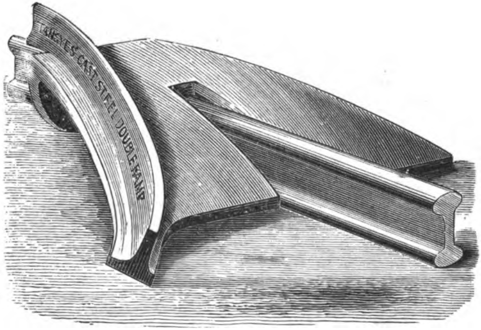
Size... ... ...No.	2	3	4
To re-rail	ORDINARY TRUCKS	SPECIAL HEAVY TRUCKS	LOCOMOTIVES
Weight ... ...each	84 lbs.	150 lbs.	180 lbs.
Price per set of Four			
WROUGHT-IRON £	8 0 0	12 0 0	18 0 0
STEEL ... ... £	5 0 0	8 0 0	12 0 0

In ordering, a Section of the Rail used should be sent.

TANGYES'

DOUBLE RAILWAY RAMPS

For Re-railing Rolling Stock.

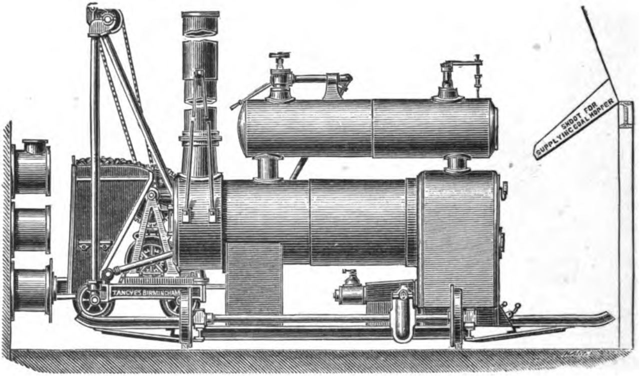

TANGYES' CAST STEEL DOUBLE RAMP

Size	A	B	C
To re-rail ...	ORDINARY TRUCKS	SPECIAL HEAVY TRUCKS	LOCOMOTIVES
Weight ... each	150 lbs.	190 lbs.	240 lbs.
Price per pair			
WROUGHT-IRON £	7 0 0	9 0 0	10 10 0
STEEL ... £	5 0 0	6 0 0	7 10 0

In ordering, a Section of Rail should be sent.

THE "ROSS" PATENT STEAM GAS-STOKER

TANGYES LIMITED, SOLE MAKERS.


SHOOT FOR SUPPLYING COAL HOPPER
TANGYES BIRMINGHAM

CHARGING MACHINE

The illustration shows the American Patent Machine for charging Gas Retorts with coal. The wrought-iron Hopper is fixed on a travelling frame for moving across the house. It is divided into three parts, having angular movable partitions, each division holding a little over 3 cwt., or one charge. When the mouth of the Hopper is placed in the Retort the charge is blown in by a few sharp blasts of steam, at 80 lbs. pressure, which is conveyed by a "walking" pipe fitted with carefully constructed joints. The Hopper is raised or lowered, and moved transversely by a small Engine fitted on the Hopper Carriage which is carefully covered in to protect the working parts from coal dust.

Steam is supplied by a Multitubular Boiler of the Locomotive type, of ample size, having a Steam Receiver on the top and Water Tank underneath. The whole of the Machine is carried on a strong wrought-iron frame, fitted with axles and wheels. A separate Reversing Engine is supplied for traversing the length of Retort House.

All the handles are brought to a convenient position for working.

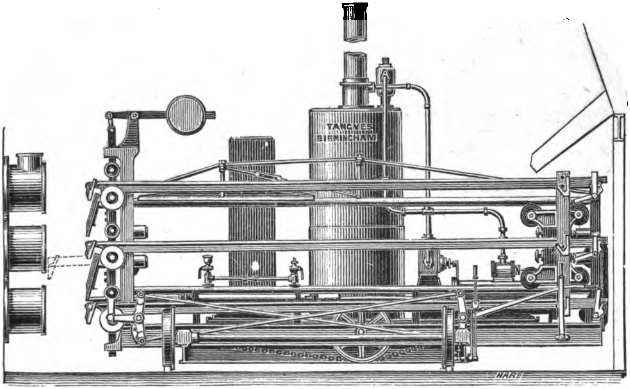
The great advantage of this Machine is the speed with which the Retorts are charged, enabling the doors to be quickly closed and preventing waste of the best gas. Two men will do the work of four or five.

The Machines are in operation at the Windsor Street Works of the Birmingham Corporation, and at the Nine Elms Works of the London Gas Light Company.

Particulars on application.

THE "ROSS" PATENT STEAM GAS-STOKER

TANGYES LIMITED, SOLE MAKERS.



DRAWING MACHINE

The illustration shows the American Patent Machine for drawing the charge from Gas Retorts. The Rakes are generally three in number, one for each line of Retorts, one only being in use at a time; but they are so arranged that they can easily be connected to the Travelling carriage for drawing. The Rake Bars are carried in guide rollers fixed in a lifting bar at the head of Machine, and so balanced that the workman can easily raise and pass the rake over the coke when entering the Retort.

The reciprocating motion of the Travelling Carriage is given by a chain passing round a wheel, rotated by a rack and pinion, the motive power being obtained by a direct-acting steam cylinder controlled by a cataract.

The whole of the Machine with Boiler is carried on a strong wrought-iron frame with large wheels and axles ; it is fitted with a small reversing Engine for traversing the Retort House.

All the handles are brought to a convenient position so that one man can work them. The Machine will easily draw 80 Retorts per hour, and enables two men to do the work of about 10 or 12, according to the number of Retorts.

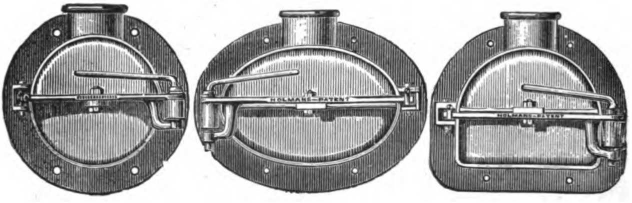
The Machines are in operation at the Windsor Street Works of the Birmingham Corporation, and at the Nine Elms Works of the London Gas Light Company.

Particulars on application.

MORTON'S SELF-SEALING RETORT LID

With Holman's Patent Anti-Friction Catch and Self-sustaining Cross Bar.

TANGYES LIMITED, SOLE MAKERS.



These Patent Retort Lids and Fastenings are in extensive use in most of the Gas Works in Great Britain, America, and on the Continent, and have almost entirely displaced the older method of sealing by a luting of lime or other material. The Lids are made in three forms, D, oval and round (as shown above,) in each of which we have a very extensive variety of patterns from which Gas Engineers contemplating the adoption of these lids are recommended to make their selection in order to avoid cost of pattern making, delays, &c., &c.

Mouthpieces with Circular Lids for Oval Retorts

Pattern No.	Diam. Mouth	Internal Dimensions of Retort	Length of Mouthpiece	Price Lid & Fittings
13658	14 ins.	14 × 12 ins.	15 ins.	£1 6 6
4356	14 "	18½ " 12 "	12¾ "	1 6 6
6851	15 "	16 " 14 "	13 "	1 8 0
3629	15 "	18¼ " 13½ "	14 "	1 8 0
3580	15 "	21 " 15 "	15 "	1 8 0
6264	16 "	18½ " 15¼ "	15¾ "	1 9 0
5210	16 "	20 " 14 "	15 "	1 9 0
6263	16 "	24 " 16 "	13½ "	1 9 0
5370	17 "	20 " 14 "	14 "	1 12 0
6832	17 "	20 " 14 "	17 "	1 12 0
6183	17 "	20 " 15 "	15 "	1 12 0
4289	17 "	21 " 15 "	14 "	1 12 0
5270	17 "	22 " 14 "	14 "	1 12 0
3631	18 "	18 " 14 "	20 "	1 14 0
3681	18 "	21 " 14 "	13¼ or 15 "	1 14 0
3554	18 "	21 " 15 "	14¾ "	1 14 0
7957	18 "	22 " 16 "	14 "	1 14 0
8048*	19 "	25½ " 15 "	18 "	1 18 0

Price of Mouthpieces depends on number required, which please state when enquiring. The sizes given in list we have patterns for; new patterns are charged for at cost price.

MORTON'S SELF-SEALING RETORT LID

Mouthpieces for Round Retorts.

Diam. ... ... ins.	14	15	16	17	18
Price Lid and Fittings £	1 6 6	1 8 0	1 9 0	1 12 0	1 14 0

Mouthpieces with Circular Lids for D Retorts

Pattern No.	Diam. Mouth	Internal Dimensions of Retort	Length of Mouthpiece	Price Lid & Fittings
5348	14 ins.	14 × 13 ins.	7 ins.	£1 6 6
3463	15 "	15 " 13 "	14 "	1 8 0
6678	15 "	15 " 14 "	12 "	1 8 0
3661	15½ "	15½ " 13 "	12 "	1 9 0
13052	16 "	16 " 13 "	18 "	1 9 0
5601	16 "	16 " 14 "	15 "	1 9 0
6827	16 "	16 " 14 "	17 "	1 9 0
4494	16 "	16 " 14 "	14 "	1 9 0
3548	16 "	16 " 15 "	12¾ "	1 9 0
6677	16 "	16½ " 13½ "	12¼ "	1 9 0
9645	16 "	16½ " 13½ "	12¼ "	1 9 0
4434	16 "	17¾ " 14 "	14 "	1 9 0
6469	16 "	18 " 14 "	15 "	1 9 0
9015	16 "	18 " 14 "	18⅛ "	1 9 0
4327	16 "	18 " 15 "	15½ "	1 9 0
8049*	16 "	18 " 15 "	17⅞ "	1 9 0
6137	16 "	20½ " 13½ "	13¼ "	1 9 0
5918	17 "	18 " 14 "	14 or 17 "	1 12 0
5053	17 "	19⅜ " 12 "	14⅛ "	1 12 0
7548	17 "	20 " 13 "	15 "	1 12 0
6468	17 "	20 " 16 "	15⅛ "	1 12 0
4316 B	17 "	21 " 14 "	14 "	1 12 0
7975	17 "	21 " 15 "	14⅛ "	1 12 0
13459	17 "	21½ " 13½ "	15 "	1 12 0
12990	18 "	18 " 15 "	15 or 19 "	1 14 0
7135	18 "	18¾ " 15 "	13 "	1 14 0
10221	18 "	18 " 16 "	12⅝ "	1 14 0
4506	18 "	20 " 13 "	19½ "	1 14 0
6470	18 "	20 " 13 "	15 "	1 14 0
6818	18 "	20 " 13½ "	17⅛ "	1 14 0
4083	18 "	20 " 15 "	16 "	1 14 0
5306	18 "	20½ " 14 "	13½ "	1 14 0
13295	18 "	20½ " 14 "	19½ "	1 14 0
7356	18 "	20½ " 13½ "	13 "	1 14 0
4569	18 "	21 " 14 "	18 "	1 14 0
3628	18 "	21 " 15 "	16 "	1 14 0
7640	18 "	22 " 12½ "	13¼ "	1 14 0
7971*	20 "	20 " 15 "	18 "	2 0 0

*Patterns marked * have Sockets at back to connect to Retorts; all the others are flanged. Patterns marked* B *have curved bottoms.*

MORTON'S SELF-SEALING RETORT LID

Mouthpieces with Oval Lids for Oval Retorts

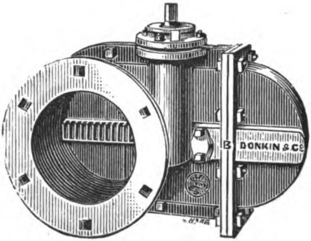
Pattern No.	Dimensions of Mouth	Internal Dimensions of Retort	Length of Mouthpiece	Price Lid & Fittings
9800	18 × 14⅞ ins.	18 × 14⅞ ins.	15 ins.	£1 15 0
9205	20 " 12 "	24 " 14 "	10¼ "	1 18 0
10000	20½ " 14¼ "	20½ " 14¼ "	15 "	1 18 0
9680	21 " 15 "	21 " 15 "	15 "	2 2 0
10056	21 " 14½ "	21 " 14½ "	15¾ "	2 2 0
13218	21 " 15 "	21 " 15 "	17 "	2 2 0
10514	22½ " 13⅜ "	22½ " 13⅜ "	13¾ "	2 3 0
13766	20 " 17 "	20 " 17 "	15 13/16"	2 5 0
13269	24 " 15 "	24 " 15 "	16 "	2 8 0

Mouthpieces with D Lids for D Retorts

Pattern No.	Dimensions of Mouth	Internal Dimensions of Retort	Length of Mouthpiece	Price Lid & Fittings
12292	15½ × 13 ins.	15½ × 13 ins.	12 ins.	1 14 0
9967	16 " 14 "	16 " 14 "	15⅛ "	1 15 0
13574	16¾ " 13¾ "	16¾ " 13¾ "	12¼ "	1 16 0
9899	18 " 12 "	18 " 12 "	14 "	1 16 0
12980	16 " 16 "	16 " 16 "	18 "	1 17 0
13900	18 " 13¾ "	18 " 13 "	15 "	1 17 0
9912	18 " 13½ "	18 " 13½ "	17 "	1 17 0
9962	18 " 13½ "	18 " 13½ "	16 "	1 17 0
10982	18 " 13½ "	18 " 14 "	15 "	1 17 0
11098	18 " 14 "	18 " 14 "	12 "	1 17 0
9492	20 " 13 "	20 " 13 "	15 "	1 19 0
9208	20 " 13 "	20 " 13 "	19½ "	1 19 0
10251	20 " 13 "	20 " 13 "	15⅛ "	1 19 0
12964	20 " 13 "	20 " 13 "	13½ "	1 19 0
9909	20 " 13¾ "	20 " 13¾ "	17 "	1 19 0
12969	19½ " 15½ "	19½ " 15½ "	14 "	2 0 0
13781	20 " 15 " Front 21 " 15 " Back	21 " 15 "	15 "	2 0 0
7692	21 " 15½ "	21 " 15½ "	16 "	2 0 0
12978	20 " 16 "	20 " 16 "	17 "	2 0 0
13252	20 " 16 "	20 " 16 "	18 "	2 0 0
13220	21 " 15 "	21 " 15 "	17 "	2 0 0
8977	21½ " 13¾ "	21½ " 13¾ "	18¾ "	2 2 0
8976	21½ " 13¾ "	21½ " 13¾ "	18¾ "	2 2 0
10497	21½ " 13¾ "	21 " 13¼ "	18⅜ "	2 2 0
8037	21½ " 13¾ "	21½ " 13¾ "	18¾ "	2 2 0
9908	21½ " 13½ "	21½ " 13½ "	15 "	2 2 0
10404	21½ " 13¾ "	22 " 14 "	18¾ "	2 2 0
12410	21½ " 13¾ "	22 " 14 "	12 "	2 2 0
13822	21½ " 13¾ "	22 " 14 "	15 "	2 2 0
10515	22½ " 12⅜ "	22½ " 12⅜ "	13¼ "	2 3 0
7924	24 " 14 "	24 " 14 "	15⅝ "	2 4 0
13807	24 " 15¼ "	24 " 15¼ "	16 "	2 4 0
9015 B	25 " 14 "	25 " 14 "	12¼ "	2 5 0
10932	25 " 14 "	24 " 14 "	13½ "	2 5 0
12944 B	22 " 16 "	22 " 16 "	16 "	2 5 0

Patterns marked B *have curved bottoms.*

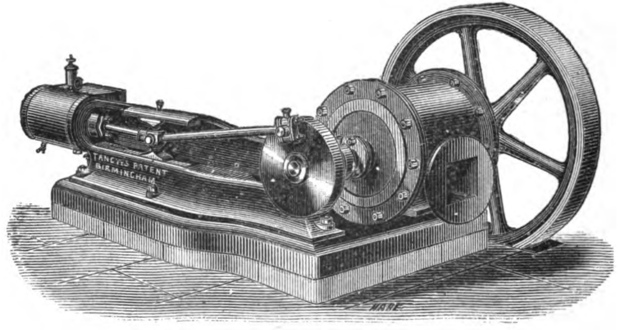
IMPROVED GAS VALVE



PROPORTIONS OF VALVES								SOCKET AND SPIGOT PIECES				
Size	Length from face to face of Flanges	Diam. Flanges	Length from end of Spigot to bottom of Socket	Depth Socket	Price			Length from Flange to end of Spigot	Length from Flange to bottom of Socket	Price per pair		
ins.	ins.	ins.	ins.	ins.	£	s.	d.	ins.	ins.	£	s.	d.
2	8½	6¾	15	2½	1	7	0	12	2½	0	4	3
3	10½	8½	17	2½	1	16	0	12	3	0	7	0
4	11½	10	18	2½	2	7	0	12	3	0	11	0
5	11¾	10½	21	3	2	18	0	14	3	0	13	0
6	11¾	12	21	3¼	3	10	0	14	3	0	17	0
7	11¾	14½	21	3¼	4	7	0	14	3	1	1	0
8	12½	15½	21	3¼	5	2	0	14	4	1	6	0
9	13½	17¾	23	3¾	6	0	0	14	4	1	14	0
10	13½	18	23	3¾	7	0	0	14	4	1	18	0
12	16	20½	24	4	9	0	0	18	4	2	14	0
14	16	22	27	4¼	12	0	0	18	4	3	8	0
15	17	23	30	5	13	0	0	18½	4	3	18	0
16	18	24½	30	5	14	10	0	19	4	4	8	0
18	18	26½	30	5½	16	15	0	20	4	4	17	0
20	20	29	31	5½	21	0	0	20	4	6	5	0
21	20	30	32	5½	22	0	0	21	4	6	15	0
22	20	31	33	6	23	0	0	21	4	7	10	0
24	20	33	34	6	25	10	0	21	4	8	0	0
26	20	35	35	6½	30	0	0	22	5	9	0	0
27	20	36	36	7	32	0	0	23	5	9	15	0
30	22	39	39	8	42	0	0	25	5	12	0	0
36	23	46	44	9	70	0	0	28	6	16	0	0
48	31	58	54	9	95	0	0	30	7	22	0	0

TANGYES' IMPROVED

ROTARY GAS EXHAUSTER



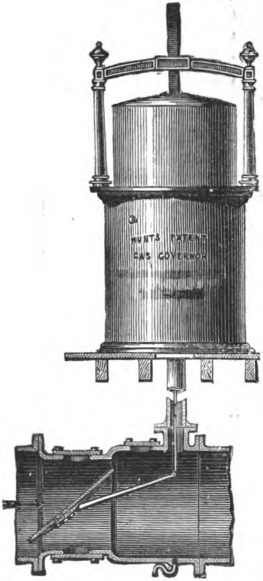
These Exhausters are supplied with or without Engine. The smaller sizes, (Nos. 1 to 6) when supplied with Engine, are mounted on strong cast-iron base plate (as illustrated), which also carries the Engine.

No.	Cubic feet per hour	In and Outlets	Horse Power of Engine	Price
1	2000	3 ins.	2	£60
2	3000	4 "	2	65
3	5000	5 "	2	75
4	7500	6 "	2	80
5	10000	7 "	3	95
6	15000	8 "	3	115
7	20000	9 "	4	125
8	30000	10 "	6	175
9	40000	12 "	8	210
10	50000	14 "	10	260

Prices of larger sizes on application.

HUNT'S PATENT EQUILIBRIUM DIRECT MAIN

GAS GOVERNOR



In this Governor a throttle valve is substituted for the ordinary suspended cone, all external communication being avoided by placing the lever or radius arm inside the valve chamber upon the disc.

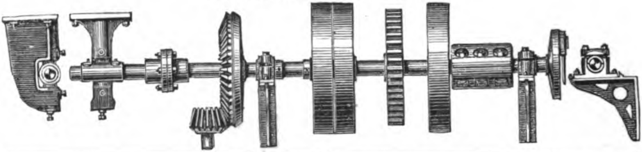
The disc is carried upon steel centres upon which it is accurately balanced.

4 ins....	£17	0	10 ins. ...	£33	0	18 ins. ...	£50	0
5 " ...	20	0	12 " ...	38	0	20 " ...	60	0
6 " ...	22	10	14 " ...	42	0	24 " ...	72	0
8 " ...	25	0	16 " ...	46	0	36 " ...	130	0

TANGYES'

SHAFTING, COUPLINGS, PLUMMER BLOCKS, &c.

All made to Whitworth's Gauge.



Diam.... ... ... ins.	1½	1¾	2	2¼	2½	2¾	3
Bright Wrot. Iron Shafting... per ft.	2/-	2/6	3/3	3/9	4/3	5/-	6/-
Bright Flanged Couplings, fitted with bolts and nuts, including keys and keyways ... ... per pair	20/-	24/-	26/6	30/-	32/6	40/-	45/-
Improved Sleeve Couplings, fitted with bolts and nuts ... per pair	11/-	13/-	15/-	20/-	22/-	28/-	32/-
Bright Loose Collars, bored and turned, and fitted with steel pointed set screws ... ... each	2/6	3/3	3/9	4/-	4/6	4/9	5/6
Plummer Blocks, with brasses, &c., complete ... ... each	8/-	9/-	11/6	14/-	17/-	21/-	28/-
Ditto, ditto, with Tangyes' anti-friction metal bearings, &c., complete ... ... each	7/-	9/-	10/-	11/-	14/-	19/-	23/-

Diam.... ... ... ins.	3¼	3½	3¾	4	4½	5	5½
Bright Wrot. Iron Shafting... per ft.	7/-	8/6	9/6	11/-	15/-	19/-	26/-
Bright Flanged Couplings, fitted with bolts and nuts, including keys and keyways ... ... per pair	50/-	55/-	65/-	75/-	100/-	130/-	150/-
Improved Sleeve Couplings, fitted with bolts and nuts ... per pair	35/-	40/-	45/-	50/-	65/-	..	..
Bright Loose Collars, bored and turned, and fitted with steel pointed set screws ... ... each	6/3	7/-	7/6	9/-	11/-	13/-	16/-
Plummer Blocks, with brasses, &c., complete ... ... each	35/-	40/-	60/-	60/-	80/-	80/-	105/-
Ditto, ditto, with Tangyes' anti-friction metal bearings, &c., complete ... ... each	30/-	32/-	50/-	50/-	60/-	60/-	85/-

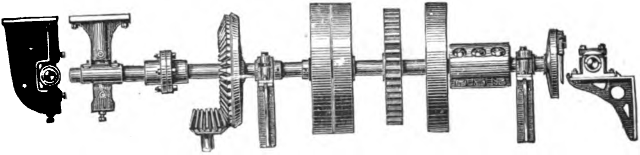
Hangers, with Brasses complete from 28s. per cwt. Wall Boxes and Brackets, from 14s. per cwt.

NOTE.—The prices for Shafting are for three or more equal lengths in one order. For a less quantity, and for odd lengths, add 10 per cent. to above prices. The loose collars are recommended in preference to collars welded on shafts being much more convenient and useful.

TANGYES'

TURNED AND BORED DRIVING PULLEYS

With Key Ways Cut.



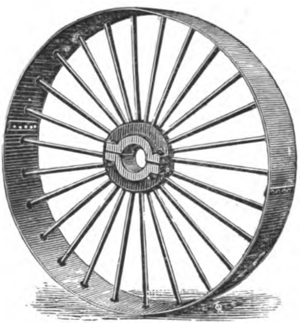
Diam. Inches	INCHES BROAD							
	4	5	6	7	8	9	10	12
8	6/6	8/6	9/6	11/-	12/-			
9	8/6	10/6	11/6	13/-	15/-	16/6		
10	9/-	11/-	13/6	15/-	16/6	19/6	21/-	
12	10/-	13/6	15/6	18/6	20/-	22/-	24/-	
14	14/-	17/6	20/-	20/-	21/6	24/6	28/-	31/6
16	16/-	18/6	21/6	23/-	25/6	29/-	32/-	37/-
18	18/-	19/6	23/-	25/-	28/-	32/6	35/-	42/6
20	20/-	22/6	25/-	29/-	32/6	36/-	39/6	45/-
22	26/-	31/-	37/-	40/6	45/-	53/-	58/6	63/6
24	30/-	32/6	39/-	42/-	46/6	54/-	59/6	66/-
26	45/-	47/6	49/-	50/6	56/-	62/6	74/-	80/-
28	46/-	48/-	51/-	53/6	59/6	64/-	80/-	90/-
30	47/6	49/6	53/-	56/6	61/6	66/-	82/6	95/-
32	49/6	51/-	55/-	66/6	70/-	82/6	95/-	110/-
35	55/-	58/-	60/-	68/6	71/6	85/-	100/-	120/-
40		60/-	65/-	70/-	75/-	90/-	105/-	125/-
42		62/6	70/-	72/6	85/-	95/-	120/-	135/-
46		65/-	72/6	75/-	92/6	100/-	130/-	140/-
48		75/-	85/-	87/6	105/-	115/-	150/-	165/-

Keys, extra.

Split Pulleys 20 per cent. more than above prices

IMPROVED

WROUGHT-IRON DRIVING PULLEY



Arms fitted into boss, not cast, and so secured to rim that they cannot work loose. Rim made strong enough to prevent buckling.

The Pulley is perfectly balanced.

Pulley with Double Arms, extra.

Diam. ins.	BREADTH ON FACE									
	3 ins.	4 ins.	5 ins.	6 ins.	7 ins.	8 ins.	9 ins.	10 ins.	11 ins.	12 ins.
10	13/-	14/6	15/6	17/-	19/-	20/6	23/-	25/6	29/-	32/-
12	14/-	15/6	16/6	18/-	20/-	22/-	24/-	26/6	30/-	33/-
14	15/-	16/6	17/6	19/-	21/-	22/6	25/-	27/6	31/-	34/-
16	17/-	18/-	19/-	20/6	22/6	24/-	26/6	29/-	32/6	35/6
18	18/-	20/-	22/-	24/-	25/6	27/6	29/6	30/6	34/-	36/6
20	19/6	22/-	24/6	26/6	28/6	30/-	31/6	33/-	35/-	38/-
22	22/6	24/-	27/-	29/6	31/6	33/-	35/-	37/-	39/-	41/-
24	25/-	27/6	29/6	32/-	34/-	36/-	38/-	40/-	42/-	44/-
26	28/-	30/-	32/6	35/-	37/-	39/-	41/6	43/6	45/6	48/-
28	31/6	34/-	35/6	37/6	40/-	42/6	44/6	47/6	49/6	51/6

IMPROVED

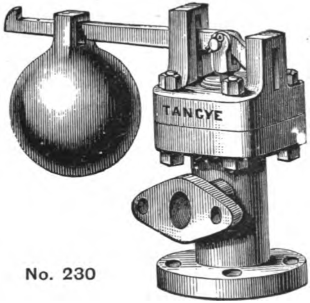
WROUGHT-IRON DRIVING PULLEY

Diam. ins.	BREADTH ON FACE									
	3 ins.	4 ins.	5 ins.	6 ins.	7 ins.	8 ins.	9 ins.	10 ins.	11 ins.	12 ins.
30	33/-	35/6	38/-	40/-	42/6	44/6	46/6	49/-	51/6	55/-
32	35/6	37/6	40/-	42/6	45/-	47/6	50/-	52/5	55/-	57/6
34	37/6	40/-	42/6	45/-	47/6	50/-	52/6	55/-	57/6	60/-
36	40/-	42/6	45/-	47/6	50/-	52/6	55/-	57/6	60/-	63/-
38	45/-	48/-	51/-	52/6	55/-	57/6	60/-	63/-	67/-	70/-
40	47/-	50/-	53/-	56/-	59/-	62/-	65/-	69/-	72/-	75/-
42	49/-	52/6	56/-	59/6	62/6	65/6	68/6	72/6	75/6	80/-
44	55/6	59/-	63/-	66/-	69/-	72/-	75/-	79/-	83/-	86/-
46	60/-	63/-	66/-	69/-	72/-	75/-	78/-	82/-	86/-	90/-
48	62/6	65/6	68/6	71/-	74/-	77/-	80/-	84/-	88/-	92/-
50	67/6	70/6	73/6	76/-	79/-	82/-	85/-	89/-	93/-	97/-
52	72/6	75/6	78/6	81/-	84/-	87/-	90/-	94/-	98/-	102/-
54	77/6	80/6	83/6	86/-	89/-	92/-	95/-	99/-	103/-	107/-
56	82/6	85/6	88/6	91/-	94/-	97/-	100/-	104/-	108/-	112/-
58	87/6	90/6	93/6	96/-	99/-	102/-	105/-	109/-	113/-	117/-
60	92/6	95/6	98/6	101/-	104/-	107/-	110/-	114/-	118/-	122/-
62	98/6	101/6	104/6	107/-	110/-	113/-	116/-	120/-	124/-	128/-
64	104/6	107/6	110/6	113/-	116/-	119/-	122/-	126/-	130/-	134/-
66	110/6	113/6	116/6	119/-	122/-	125/-	128/-	132/-	136/-	140/-
68	116/6	119/6	122/6	125/-	128/-	131/-	134/-	138/-	142/-	146/-
70	122/6	125/6	128/6	131/-	134/-	137/-	140/-	144/-	148/-	152/-
72	128/6	131/6	134/6	137/-	140/-	143/-	146/-	150/-	154/-	158/-
74	134/6	137/6	140/6	143/-	146/-	149/-	152/-	156/-	160/-	164/-
76	140/6	143/6	146/6	149/-	152/-	155/-	158/-	162/-	166/-	170/-
78	148/-	151/-	154/-	156/6	159/6	162/6	165/6	169/6	173/6	177/6
80	158/-	161/-	164/-	167/6	169/6	172/6	175/6	179/6	183/6	187/6
82	168/-	171/-	174/-	177/-	179/6	182/6	185/6	189/6	193/6	197/6
84	178/-	181/-	184/-	187/-	189/6	192/6	195/6	199/6	203/6	207/6
86	188/-	191/-	194/-	197/-	199/6	202/6	205/6	209/6	213/6	217/6
88	198/-	201/-	204/-	207/-	209/6	212/6	215/6	219/6	223/6	227/6
90	210/-	213/-	216/-	219/-	221/6	224/6	227/6	231/6	235/6	239/6
92	222/-	225/-	228/-	231/-	233/6	236/6	239/6	243/6	247/6	251/6
94	234/-	237/-	240/-	243/-	245/6	248/6	251/6	255/6	259/6	263/6
96	246/-	249/-	252/-	255/-	257/6	260/6	263/6	267/6	271/6	275/6
98	260/-	263/-	266/-	269/-	271/6	274/6	277/6	281/6	285/6	289/6
100	274/-	277/-	280/-	283/-	285/6	288/6	291/6	295/6	299/6	303/6

A small Wire Gauge, giving the Diameter of the Shaft, will ensure accuracy in boring; when none is sent, the Pulleys are bored to Whitworth Standard Gauges.

In ordering, state if they are to be made Flat or rounded on the Face, and with or without Keyway.

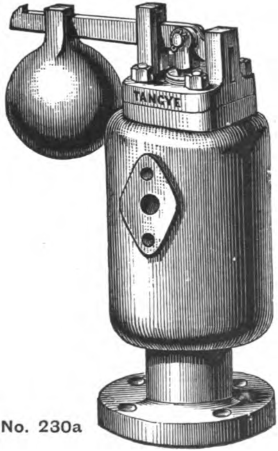
TANGYES' SAFETY VALVES



No. 230

With gun-metal valve and seat, wrought-iron lever, and cast-iron weight.

Diam. Valve	Price
1½ ins.	20/-
2 "	25/-
2½ "	32/-
3 "	38/-
3½ "	45/-
4 "	52/-
5 "	80/-



No. 230a

With cast-iron steam dome, gun-metal valve and seat, wrought-iron lever and cast-iron weight.

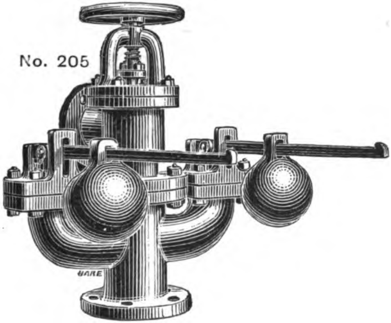
Diam. Valve	Price
1½ ins.	25/-
2 "	30/-
2½ "	40/-
3 "	50/-
3½ "	80/-

All Flanges faced and drilled.

JOHN
Bibl
Bodl.
NSON

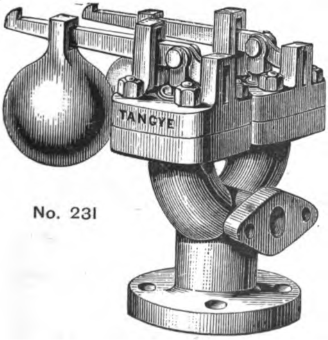
TANGYES' SAFETY VALVES

No. 205



Double safety valve, with starting valve in centre: gun-metal fittings and wrought-iron levers.

Diam. Safety Valve	Diam. Starting Valve	Price
2½ ins.	3 ins.	130/-
3 "	3½ "	150/-
3 "	4 "	160/-
3½ "	3½ "	170/-
3½ "	4 "	180/-
4 "	4 "	200/-



No. 231

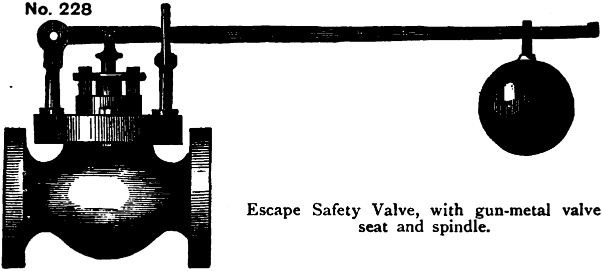
Double Safety Valve with gun-metal valves and seats, wrought-iron levers, and cast-iron weights.

Diam. Valve	Price
1½ ins.	40/-
2 "	55/-
2½ "	70/-
3 "	85/-
3½ "	100/-
4 "	130/-
5 "	170/

TANGYES'

SAFETY VALVES

No. 228

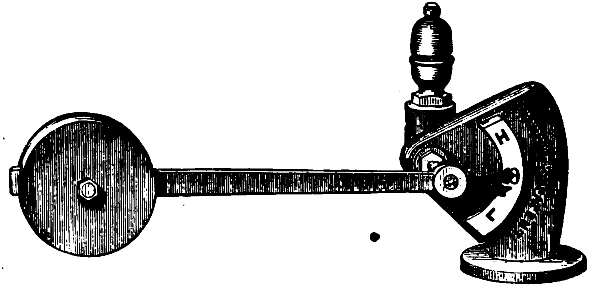


Escape Safety Valve, with gun-metal valve seat and spindle.

Size ... ins.	2	2½	3	3½	4	5	6
Price	44/-	52/-	62/-	73/-	85/-	105/-	130/-

IMPROVED SELF-ACTING

ALARM VALVE AND HIGH AND LOW WATER INDICATOR

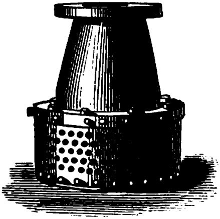


This Valve is arranged to give the alarm whenever the water is either **below** **or** **above** the proper level.

Price with Float, Brass Stuffing Box and Balance Weight, ...£2 15s.

RETAINING VALVES AND STRAINERS

No. 347.



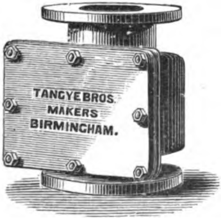
CAST IRON RETAINING VALVE

And Wrought Iron Strainer.

Diam. ins.	2	2½	3	4	5	6
Price ...	26/-	28/-	30/-	40/-	60/-	80/-
Diam. ins.	7	8	9	10	12	15
Price ...	100/-	110/-	140/-	150/-	170/-	220/-

FLANGED RETAINING VALVES

No. 301.

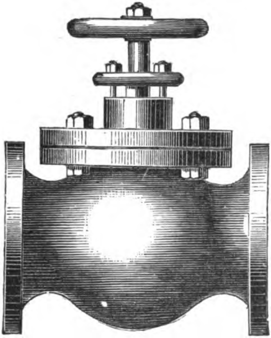


Bore	Price
2 ins.	17/6
2½ "	20/-
3 "	32/6
3½ "	40/-
4 "	45/-
5 "	65/-
6 "	80/-
7 "	105/-
8 "	120/-
9 "	160/-
10 "	200/-

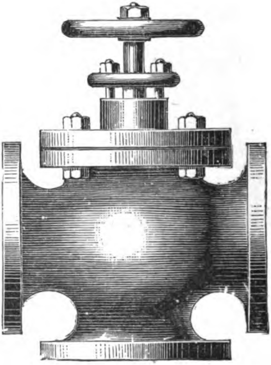
No. 301 is for 240 ft. head of water.
For higher pressures prices are extra.

TANGYES' CAST-IRON VALVES

With Gun-Metal Valves and Seats.



No. 143



No. 146

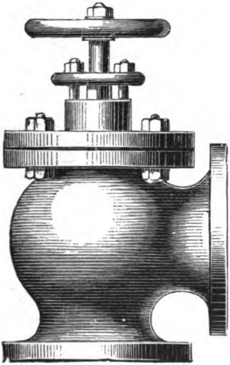
Bore	Diam. Flanges	No. 143
1½ ins.	5 ins.	21/-
2 "	6 "	24/3
2½ "	7 "	29/6
3 "	8 "	38/9
3½ "	8½ "	47/6
4 "	9 "	56/-
5 "	10½ "	81/3
5½ "	11½ "	93/-
6 "	12 "	102/6
7 "	13½ "	124/9
8 "	15 "	158/6

Bore	Diam. Flanges	No. 146
1½ ins.	5 ins.	26/6
2 "	6 "	29/6
2½ "	7 "	38/3
3 "	8 "	52/6
3½ "	8½ "	58/9
4 "	9 "	70/-
5 "	10½ "	96/3
6 "	12 "	122/-
7 "	13½ "	142/-
8 "	15 "	180/-

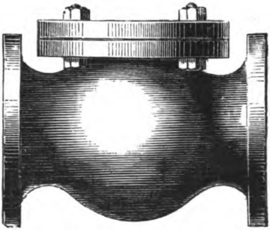
No. 143 can be made with Flange and Bib, or with two Faucet Ends, at same price.

TANGYES' CAST-IRON VALVES

With Gun-Metal Valves and Seats.



No. 147



No. 145

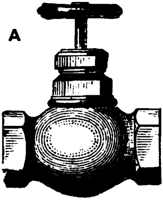
Bore	Diam. Flanges	No. 147
1½ ins.	5 ins.	21/-
2 "	6 "	24/3
2½ "	7 "	29/6
3 "	8 "	38/9
3½ "	8½ "	47/6
4 "	9 "	56/-
5 "	10½ "	81/3
6 "	12 "	102/6
7 "	13½ "	124/9
8 "	15 "	158/6

Bore	Diam. Flanges	No. 145
1½ ins.	5 ins.	17/6
2 "	6 "	20/-
2½ "	7 "	25/-
3 "	8 "	32/-
3½ "	8½ "	37/6
4 "	9 "	47/6
5 "	10½ "	...
6 "	12 "	...
7 "	13½ "	...
8 "	15 "	...

TANGYES'

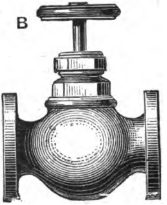
GUN-METAL STEAM VALVES AND COCKS

A

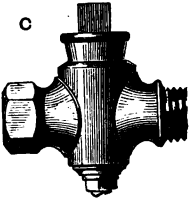


Bore	A	B
⅜ ins.	2/4	...
½ "	3/2	...
¾ "	4/10	8/8
1 "	6/9	13/-
1¼ "	9/3	17/-
1½ "	12/3	22/3
2 "	20/-	30/-

B

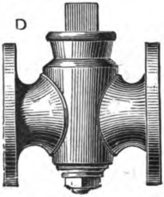


C

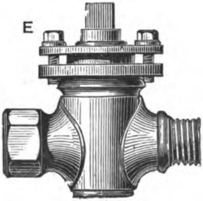


Bore	C	D
¼ ins.	2/-	...
⅜ "	2/9	...
½ "	3/6	7/2
¾ "	5/-	9/6
1 "	7/6	12/3
1¼ "	10/9	20/6
1½ "	13/9	24/9
2 "	22/6	38/3

D

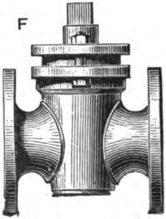


E

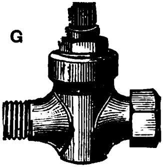


Bore	E	F
½ ins.	4/3	7/3
¾ "	5/9	10/1
1 "	8/9	15/6
1¼ "	11/9	21/6
1½ "	16/3	27/6
2 "	27/6	46/3
2½ "	48/9	62/6
3 "	72/6	83/6

F

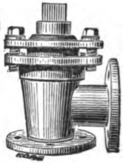


G



Bore	G	H
½ ins.	7/-	...
¾ "	10/6	18/6
1 "	16/-	25/6
1¼ "	23/-	35/-
1½ "	31/-	45/-
2 "	45/-	65/-
2½ "	85/-	100/-
3 "	112/-	135/-

H



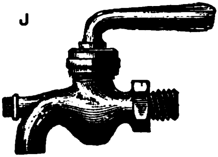
TANGYES'

GUN-METAL PET AND GAUGE COCKS &c.

Asbestos Packed.

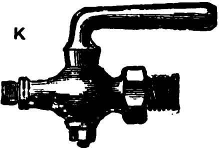
Globe Barrel.

J

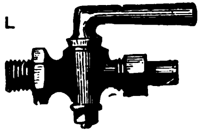


Bore	J	K
½ ins.	7/6	5/-

K

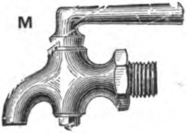


L

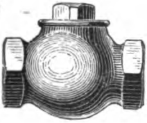


Bore	L	Bore	M
⅛ ins.	3/-	¼ ins.	2/10
¼ "	3/4	⅜ "	3/8
⅜ "	4/10	½ "	4/10
½ "	5/6	⅝ "	6/-
¾ "	7/11	¾ "	7/6
1 "	12/9	1 "	11/-

M

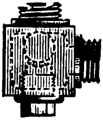


N

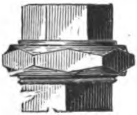


Bore	N	O
½ ins.	3/-	4/6
¾ "	4/9	6/7
1 "	6/4	9/1
1¼ "	8/6	13/-
1½ "	12/3	16/-
2 "	18/-	23/3

O

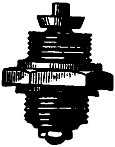


P



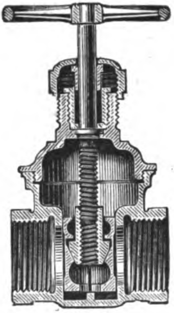
Bore	P	R
⅜ ins.	2/9	...
½ "	3/6	2/11
¾ "	5/-	3/9
1 "	7/-	4/9
1¼ "	10/6	6/4
1½ "	12/-	8/6
2 "	17/6	10/9

R

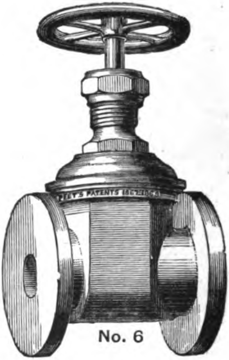


PEET'S PATENT VALVE

Gun-metal



No. 1



No. 6

No. …	1, 2 & 3	4	5	6	7 & 8	8^{A}	9	10
½ in.	4/9	6/9	8/-	6/9	6/6	5/-	8/6	4/9
¾ "	6/6	9/9	10/9	10/-	9/6	7/-	11/3	6/6
1 "	9/-	12/-	14/3	13/6	11/9	9/9	14/9	9/-
1¼ "	12/-	16/6	19/3	18/-	16/-	13/-	20/-	12/-
1½ "	15/-	22/-	27/-	25/6	20/6	17/-	28/-	15/-
1¾ "	20/-	30/-	36/-	34/-	28/-	22/-	37/-	20/-
2 "	24/-	36/-	42/6	41/-	34/-	26/-	44/-	24/-
2¼ "	43/6	…	…	…	…	…	…	…
2½ "	48/6	63/-	72/6	70/-	60/-	51/6	77/6	48/6
3 "	62/-	82/6	92/6	87/6	77/6	66/6	97/6	62/-
3½ "	83/6	…	…	107/6	…	…	…	…
4 "	120/-	…	…	150/-	…	…	…	…
5 "	…	…	…	210/-	…	…	…	…
6 "	…	…	…	300/-	…	…	…	…

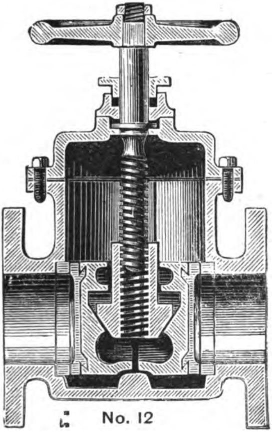
No. 1 Two Female Ends
" 2 Male and Female
" 3 Two Male Ends
" 4 Male and Female Union

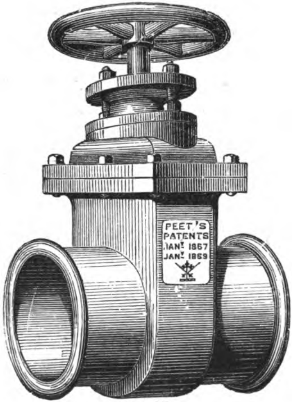
No. 5 Flange and Union
" 6 Two Flanges
" 7 Flange and Bib
" 8 Male or Female and Flange

No. ^{A}8 Male or Female and Bib
" 9 Two Unions
" 10 Taper Ends Tinned

PEET'S PATENT VALVE

Cast-iron


No. 12



No. 15

No. ...	12, 13 & 14	12A	15, 16, 17 & 18	19	19A
1½ in.	26/-	27/6	27/6	20/6	22/-
2 "	30/6	32/6	32/6	23/-	25/-
2½ "	35/-	38/-	38/-	27/6	30/6
3 "	45/-	48/-	48/-	34/-	37/-
3½ "	55/-	59/-	58/-	42/-	46/-
4 "	65/-	70/-	68/-	50/-	55/-
5 "	80/-	86/-	83/-	62/6	68/6
6 "	112/6	120/-	115/6	88/-	95/6
7 "	132/6	...	135/-	103/-	...
8 "	160/-	...	163/-	116/-	...
9 "	185/-	...	190/-	142/6	...
10 "	220/-	...	227/6	170/-	...
11 "	270/-	...	280/-	202/6	...
12 "	320/-	...	330/-	230/-	...

No. **12** Two Flanges
" **13** Flange and Bib
" **14** Flange & Union
" **15** Two Faucets

No. **16** Flange & Faucet
" **17** Spigot & Faucet
" **18** Spigot & Flange

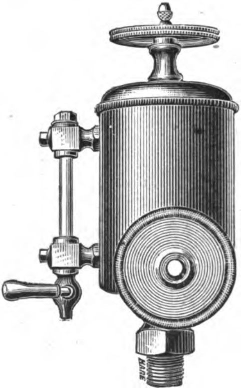
No. **19** Wrought-iron Spindle
" **19A** Two Female Ends, all iron

TANGYES' IMPROVED

DISPLACEMENT OR GRAVITY LUBRICATOR

(Gun Metal)

SUITABLE FOR BOTH CONDENSING AND NON-CONDENSING ENGINES.



The supply of oil to the engine cylinder is made through a small orifice in the top of the centre pipe—its consumption being regulated by displacement—condensed water accumulating in the Lubricator and floating the oil on its surface.

The necessary quantity of Lubricant for starting the engine may be injected by filling above the orifice in centre pipe.

External Diam.	For Engines up to	Screwed to gas thread	Price	Glass Gauge extra
2½ ins.	10 H.P.	¾ ins.	22/6	7/6
3 "	20 "	¾ "	30/-	7/6
3½ "	30 "	¾ "	37/6	7/6
4 "	40 "	¾ "	45/-	10/-
5 "	70 "	1 "	55/-	10/-
6 "	100 "	1 "	67/6	10/-

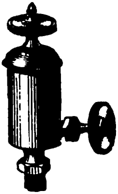
TANGYES'

GUN-METAL STEAM SUET LUBRICATOR

This Lubricator is designed for the use of suet or rough fat which is cheap, pure, free from salt, alkalis, and grit, &c. It should be fixed on the steam pipe, close to the Engine.

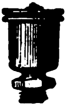
INSTRUCTIONS FOR USE.

To charge the Lubricator with suet,—unscrew the cover, and fill the receiver with the suet or fat; then screw on the cover, so as to render the top steam tight. By turning the small wheel at the bottom (more or less, as required) steam will be admitted to the Lubricator, and the suet will be gradually consumed.



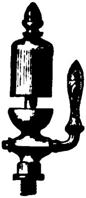
External Diameter	For Engines up to	Screwed to Gas Thread	Entirely Gun-metal
1 ins.	1 H. P.	¼ ins.	£0 7 0
1¼ "	2 "	⅜ "	0 8 0
1½ "	4 "	½ "	0 9 6
2 "	6 "	½ "	0 11 6
2½ "	10 "	¾ "	0 14 0
3 "	20 "	¾ "	1 2 6
3½ "	30 "	¾ "	1 8 6
4 "	40 "	¾ "	1 13 0
5 "	70 "	1 "	2 2 6
6 "	100 "	1 "	2 12 0

GUN-METAL OIL CUP



Size ... ins.	1	1¼	1½	1¾	2	2½
Price ...	1/3	1/6	1/9	2/6	3/6	7/2

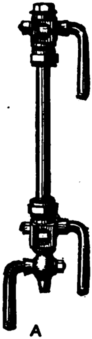
GUN-METAL STEAM WHISTLE AND HUMMER



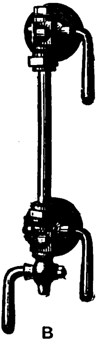
Size ... ins.	1¼	1½	2	2¼	2½	3	3½	4	4½	5	6
Steam Whistle as shewn	9/9	10/-	14/9	17/-	18/6	22/6	37/6	50/-	57/6	68/6	95/9
Steam Hummer	...	...	10/6	...	14/-	18/6	24/9	43/6	...	50/-	72/6

TANGYES'

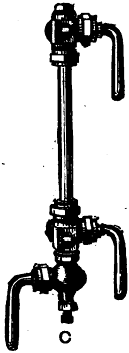
GUN-METAL WATER GAUGE FITTINGS



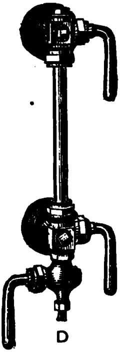
A



B



C



D

These Fittings are heavier, better finished, and generally of much superior quality to those usually offered in the market.

The glands are all *Asbestos packed.*

Patterns A and B (Globe Barrel)

Size ... . in.	½	⅝	¾	⅞
A Screwed Shank ...	26/-	34/-	40/-	45/-
B Flanged	32/-	38/-	45/-	50/-

Patterns C and D (Gland Packed)

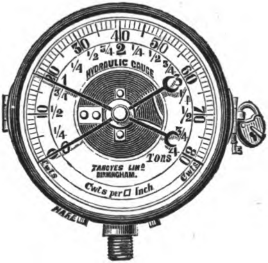
Size ... ... in.	½	⅝	¾	⅞
C Screwed Shank ...	33/-	42/-	52/-	57/-
D Flanged	40/-	49/-	60/-	65/-

BEST FLINT GLASS TUBES FOR WATER GAUGES

Length ... ... ins.	12	13	14	15	16	17	18
Outside Diam. ...½in.	4/3	4/6	4/9	5/-	5/3	5/6	6/- doz.
" " ...⅝ "	5/-	5/6	6/-	6/6	7/-	7/6	8/- "
" " ...¾ "	6/6	7/3	8/-	8/9	9/6	11/3	12/- "
" " ...⅞ "	8/-	9/-	10/-	11/-	12/-	13/-	14/- "

PATENT HYDRAULIC GAUGE

On an Improved Principle.



In case with brass rim, to indicate to

300, 500, 1000, or 1500 lbs. per square inch.

No. 1 " 2	4 in. Dial 6 " "	40/- 55/-

If with Maximum Pointer, 6/3 Extra.

To indicate to

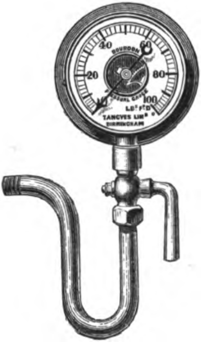
1, 2, 4, 6 or 10 tons per square inch.

No. 3 " 4	6 in. Dial 9 " "	75/- 95/-

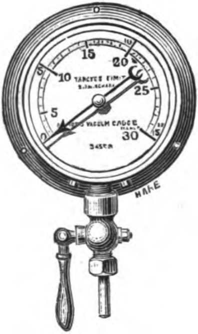
Maximum Pointers included in prices of Nos. 3 and 4.

STEAM PRESSURE AND VACUUM GAUGES

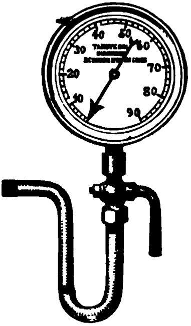
(Bourdon's Patent.)



..o. I.



No. 2 (Vacuum.)



No. 2.

No. I PATTERN, in Brass Case, without Flange.

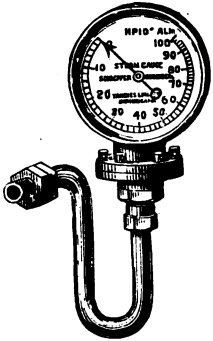
3	ins. diam. without Cock, any pressure up to 100 lbs.	17/6
4	" " " " " 120 "	18/6
5	" " " " " 120 "	20/-
6	" " " " " 150 "	25/-
5	" Vacuum Gauge " "	20/-
6	" " " " "	25/-

No. 2 PATTERN, in Brass Case, with Flange.

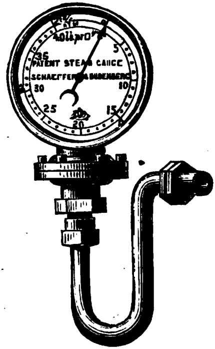
5	ins. diam. any pressure up to 200 lbs....	22/-
6	" " " "	27/-
7	" " " "	30/-
8	" " " "	40/-
9	" " " "	50/-
10	" " " "	60/-
6	" Vacuum Gauge "	27/-
7	" " " "	30/-

STEAM PRESSURE & VACUUM GAUGES

(Schaeffer's Patent.)



No. 1



No. 2

STEAM AND VACUUM GAUGES, No. 1 PATTERN

In Metal Case, with narrow Brass Rim and Syphon

To indicate up to 40, 60, 80, 100, 120, 150, 180, 200, or 300 lbs. per square inch.	
3 ins. diam.	22/6
4 "	25/-
If with Guard, 2/6 extra.	
To indicate up to 15, 20, 30, 40, 60, 80, 100, 150, 180, 200 or 300 lbs. per sq. in.	
6 ins. diam.	34/6

STEAM AND VACUUM GAUGES, No. 2 PATTERN

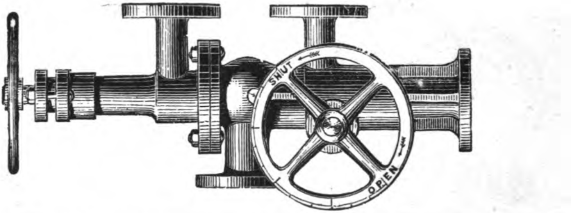
In Metal Case, with broad Brass Rim and Bracket, or with Syphon instead of Bracket

To indicate up to 40, 60, 80, 100, 120, 150, 180, 200, or 300 lbs. per square inch	
3 ins. diam.	25/-
4 "	27/6
If with Guard, 2/6 extra	
To indicate up to 15, 20, 30, 40, 60, 80, 100, 150, 180, 200, or 300 lbs. per sq. in.	
6 ins. diam.	40/-

Gauges for 250 or 500 feet Head of Water, same prices.

IMPROVED INJECTOR

(Gresham's Patent.)



Size Millimetres	Class **A**		**B**		**G**		**H**		**I**	Inside Diam. Pipes
	All Brass	Iron Case	All Brass	Iron Case	All Brass	Iron Case	All Brass	Iron Case	Iron Case	
No. 2	£3 15	£3 10	£2 15	£2 12	...	...	£3 15	£3 10	£3 0	½ ins
" 3	4 0	3 15	3 0	2 17	...	...	4 10	4 0	3 10	½ "
" 4	5 15	4 10	3 18	3 5	£3 15	£3 0	5 15	5 0	4 0	1 "
" 5	6 5	4 15	4 10	3 10	4 5	3 5	6 15	6 0	4 10	1 "
" 6	8 15	6 10	6 0	4 5	5 10	3 15	8 15	7 0	5 0	1¼ "
" 7	9 5	7 10	6 15	4 10	6 5	4 5	10 0	8 0	6 0	1¼ "
" 8	12 0	8 15	8 5	6 0	8 0	5 15	12 10	9 10	7 0	1½ "
" 9	13 0	9 15	9 5	7 0	9 0	6 10	14 0	11 0	8 0	1½ "
" 10	15 0	11 15	10 10	8 5	10 0	8 0	16 10	12 10	9 0	2 "
" 11	16 0	12 15	11 10	9 5	...	...	18 0	14 0	10 0	2 "
" 12	19 0	13 15	12 15	10 10	...	...	20 0	16 0	12 0	2¼ "

Size Injector. Millimetres.	30 lbs.	40 lbs.	50 lbs.	60 lbs.	70 lbs.	80 lbs.	90 lbs.	100 lbs.	110 lbs.	120 lbs
	Nominal Horse Power at the above Pressures.									
No. 2	4	5	5	6	6	7	7	8	8	8
" 3	9	11	12	14	15	16	17	18	18	19
" 4	17	20	22	24	26	28	30	31	33	34
" 5	27	31	35	38	41	44	47	49	52	54
" 6	39	45	50	55	59	64	67	71	75	78
" 7	53	61	68	75	82	87	92	97	102	106
" 8	69	80	89	98	106	113	120	127	133	139
" 9	88	101	113	124	134	144	152	161	168	176
" 10	108	125	142	154	166	177	193	198	208	217
" 11	131	152	170	186	201	215	228	240	252	263
" 12	156	183	206	221	239	256	271	286	303	313

Every Injector is tested before leaving the Works.

IMPROVED INJECTOR

(Hall's Patent.)

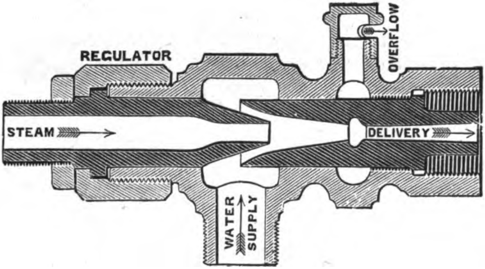


Illustration represents Class O

ALL GUN-METAL.

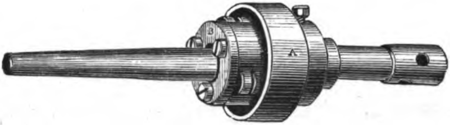
Nom. H.P.	4	8	12	16	20	30
Size in Millimetres ...	2	3	4	5	6	7
Class O., for Forcing ...	£2 10	£3 0	£4 0	£4 10	£5 0	£6 0
,, D.L., ,, Lifting ...	...	...	5 10	6 15	8 10	9 15
Galls. per hour at 50 lbs. pressure	100	150	230	300	380	600
Size of Steam Pipes ... ins.	½	½	½	¾	¾	1
Water & Delivery Pipes ,,	½	½	¾	1	1	1¼

Nom. H.P.	40	50	60	80	100	...
Size in Millimetres ...	8	9	10	11	12	...
Class O., for Forcing ...	£7 0	£8 10	£9 10	£11 0	£12 0	...
,, D.L., ,, Lifting ...	12 0	13 0	15 0	16 10	18 0	...
Galls. per hour at 50 lbs. pressure	960	1480	1920	2600	3050	...
Size of Steam Pipes ... ins.	1	1¼	1¼	1½	1½	...
Water & Delivery Pipes ,,	1¼	1½	1½	2	2	...

Every Injector is thoroughly tested before leaving the Works.

ROLLER BOILER TUBE EXPANDERS

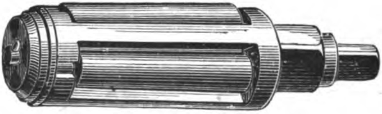
(Dudgeon's Patent.)



By means of this Expander the tubes can be expanded without striking a blow on them, thus rendering them far less liable to crack. Leaky ones can be tightened, with steam on the boiler, with perfect safety. One Expander will answer for any thickness of tube sheet, by simply shifting the position of the outside ring A, thus avoiding the necessity of an Expander for each different thickness of sheet. They are no more liable to break than the common tool, and are much more easily kept in order, as the rollers are the only things that can give out, and they can be replaced in a few moments by unscrewing the cap B.

1¼ ins.	£1 11 0	1⅞ ins.	£1 14 0	2⅝ ins.	£2 12 0	3¾ ins.	£4 8 0
1⅜ "	1 12 0	2 "	1 14 0	2¾ "	2 16 0	4 "	4 16 0
1½ "	1 12 0	2⅛ "	1 16 0	3 "	3 4 0	4¼ "	5 4 0
1⅝ "	1 13 0	2¼ "	2 0 0	3¼ "	3 10 0	4½ "	5 12 0
1¾ "	1 13 0	2½ "	2 8 0	3½ "	4 0 0	5 "	7 0 0

(Thomson's Patent.)



The following advantages are claimed for this Expander:—

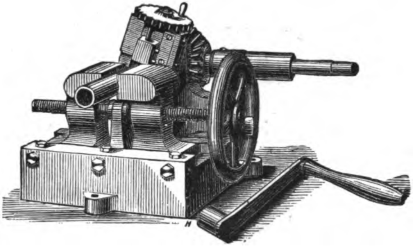
1st.—It will expand a tube in much less time than any other. 2nd.—The pressure is put on automatically, and hammering in any way, either when entering or being withdrawn from the tube, is quite unnecessary. 3rd.—The rollers being much longer than those of other tube expanders, they are more substantial, and expand the tube more uniformly, and with less liability to split the tube.

1¼ ins.	£2 0 0	1⅞ ins.	£3 5 0	2⅝ ins.	£4 15 0	3½ ins.	£5 0 0
1⅜ "	2 5 0	2 "	3 15 0	2¾ "	4 15 0	3⅝ "	5 5 0
1½ "	2 10 0	2⅛ "	4 0 0	3 "	4 15 0	3¾ "	5 5 0
1⅝ "	2 15 0	2¼ "	4 5 0	3⅛ "	5 0 0	4 "	5 5 0
1¾ "	3 0 0	2½ "	4 10 0	3¼ "	5 0 0	4⅛ "	5 10 0
						4¼ "	5 15 0

The sizes refer to the external diameter of tubes.

SELF-ACTING TUBE CUTTING MACHINE

For cutting iron or brass tubes into any required length.



The tool-box is fitted to a barrel (which revolves in a bearing cast on the frame), and forms a hollow spindle, through which tubes of any length may be passed; the tool has a self-acting feed motion vertically, by a ratchet-wheel and a catch, which gives the feed at each revolution of the tool-box; the tubes are held by two vice jaws, which open and close by a right and left hand screw, thereby always keeping the tubes central to the cutter.

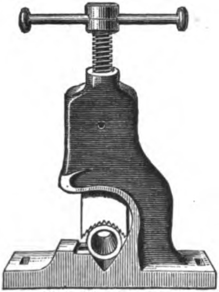
No. 1	To cut tubes from	1¼ ins.	to	2½ ins.	outside diameter		£12	10
" 2	"	1¾	"	5	"	"	22	0

Fast and Loose Pulleys to work by power, extra.

The No. 1 machine will cut off upwards of 400 lengths of 2 ins. iron tube in ten hours, and the No. 2 upwards of 200 lengths of 4 ins. in same time.

IMPROVED TUBE VICE

With Open Mouth.



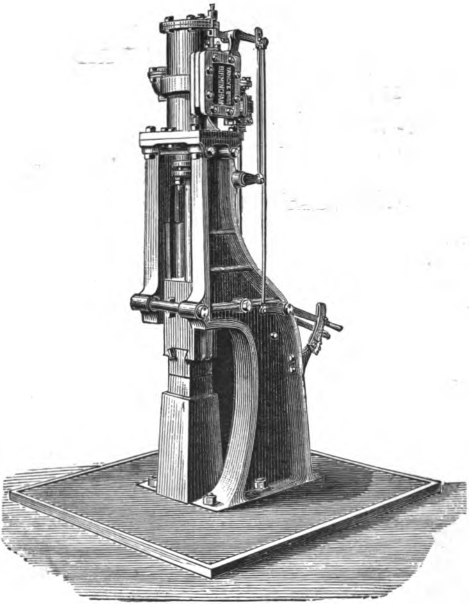
For holding wrought-iron Gas, Steam or Boiler Tubes while being screwed or cut off.

No. 1	To take	¼	to	1¼	ins.	21/6
" 2	"	¼	"	2	"	26/6
" 3	"	1¼	"	3	"	41/-

Close Mouth pattern, same prices.

PATENT STEAM HAMMER

For use in Smithies.



This Hammer is double-acting, and fitted with either hand-worked or self-acting valve motions.

The self-acting motion is exceedingly simple and efficient, and as it can also be worked with perfect ease as a *hand-motion*, it is usually preferred for all Hammers except large ones.

The Hammer will strike lightly or heavily, quickly or slowly, long or short strokes, and elastic or dead blows, as desired.

In quoting the sizes, the pressure of steam above the piston is not included. Thus in a "5 cwt. Hammer" the tup, piston, &c.. weigh at least 5 cwt.; but with steam at 30 lbs. per square inch on the piston, the total falling weight is more than 17 cwt.

PATENT STEAM HAMMER

For use in Smithies.

Size of Hammer ... cwts.	3	5	7	10	15
Diam. Steam Cylinder ... ins.	**7½**	**9¼**	**10½**	**12¼**	**13½**
Longest Stroke ... ... ″	**18**	**22**	**24**	**28**	**34**
Price ... ... £	**70**	**90**	**114**	**140**	**170**
Anvil and Base-plates, extra...£	15	22	30	40	60
Self-acting motion ... ″ ...£	5	6	6	8	10
Weight of Hammer only, cwt.	25	40	50	70	90
″ Anvil & Base-plate ″	35	55	80	110	165
Distance from Standard to centre of Anvil ... ins.	8	10	11	12½	15
Internal diam. Steam Pipes... ″	1½	1¾	2	2¼	2½
Boiler Power required, appr. H.P.	3	4	5	7	10
Appr. space for Shipment Hammer only c. ft.	39	43	87	107	152
″ Anvil and Base-plates	31	53	71	100	163
Maxim. diam. of Shafts for working which the Hammers are recommended ins.	3½	4½	5¼	6¼	7½
Length of Base-plate ... . ″	66	76	84	102	108
Breadth ″ ″ ... ″	60	69	72	84	94
Height from floor to top of Cylinder ... ... ″	94½	109¼	119	132	148

PATENT STEAM HAMMER

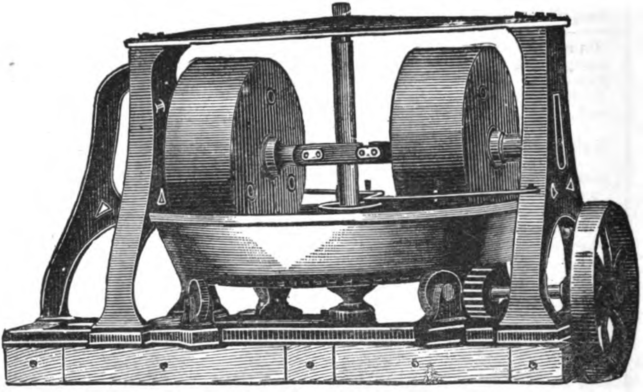
With open Standards.

This Steam Hammer is supplied in all sizes from 15 cwt. to 20 tons. It can be worked either double-acting or single-acting, the change being made in a moment. It is fitted with either hand-worked or self-acting Valve Motions according to order.

The side frames, cylinders, piston rods, &c., are of unusual strength and weight, the bottoms of the side frames and all the joints of the base plates are accurately planed and fitted, and the Hammer is in every respect suitable for making the heaviest forgings either in steel or iron.

Prices and full particulars on application.

IMPROVED MORTAR MILL

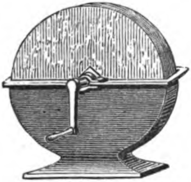


The Pans are supplied with loose bottom plates, which can be replaced from time to time, as they become worn out.

Diam. of Pan at top	Rollers	Pulley	Price
5 ft. 0 ins.	2 ft. 3 ins. × 10 ins.	2 ft. 0 ins.	£38 0
5 " 0 "	2 " 8 " × 10 "	2 " 0 "	38 0
6 " 0 "	2 " 8 " × 12 "	2 " 3 "	50 0
6 " 6 "	3 " 6 " × 12 "	3 " 0 "	55 0
7 " 0 "	3 " 6 " × 15 "	3 " 0 "	62 0
7 " 6 "	3 " 6 " × 15 "	3 " 0 "	84 0
8 " 0 "	3 " 6 " × 18 "	3 " 6 "	95 0
9 " 0 "	3 " 6 " × 20 "	3 " 6 "	108 0

The prices do not include the wood foundation shown in illustration.

GRINDSTONES IN CAST-IRON TROUGHS



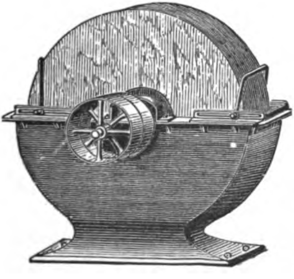
Diam. of stone	Price	If with Hood
12 ins.	£0 12 0	£0 14 6
14 "	0 14 0	0 17 0
16 "	0 17 0	1 0 0
18 "	1 6 0	1 11 0
20 "	1 12 0	1 17 0

The 20-inch Stone can be had with high foot and treadle, price 43/- If with hood, 48/-

WITH HOOD, SLIDE REST, AND TREADLE

Diam. of stone	Width of stone	Price	If with fast & loose pulleys instead of handle and treadle, extra
24 ins.	3½ ins.	£3 9 6	5/-
30 "	4 "	4 5 6	6/9
36 "	4 "	5 14 3	10/6

WITH SLIDE RESTS, AND FAST AND LOOSE PULLEYS

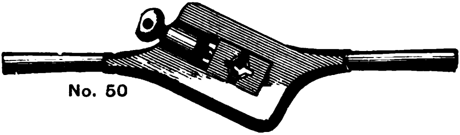


Diam. of stone	Width of stone	Price
42 ins.	5 ins.	£7 18 9
48 "	6 "	8 9 0
54 "	6 "	14 13 6
72 "	12 "	26 14 0

Can be had with hoods at an extra cost.

WARRANTED STOCKS, DIES, AND TAPS

For Engineers Whitworth's Pitch



No. 50

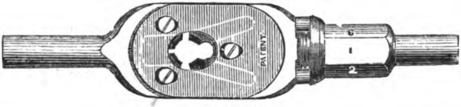
TO SCREW		With Taper and Plug Tap to each size	With Taper Second and Plug Tap to each size	With Taper Second Plug and Master Tap to each size
		£ s. d.	£ s. d.	£ s. d.
¼ 5/16 ⅜ ...	ins.	1 5 0	1 10 0	1 17 0
¼ ⅜ ½ ...	"	1 9 0	1 15 0	2 3 0
¼ 5/16 ⅜ ½ ...	"	1 17 0	2 5 0	2 15 0
¼ 5/16 ⅜ 7/16 ½	"	2 6 0	2 16 0	3 9 0
⅜ ½ ⅝ ...	"	1 12 6	2 1 0	2 11 0
¼ ⅜ ½ ⅝ ...	"	1 19 0	2 9 0	3 1 0
¼ 5/16 ⅜ ½ ⅝	"	2 8 0	2 19 0	3 14 0
½ ⅝ ¾ ...	"	2 0 0	2 10 0	3 3 0
⅜ ½ ⅝ ¾ ...	"	2 8 0	3 0 0	3 16 0
⅜ 7/16 ½ ⅝ ¾	"	2 16 0	3 11 0	4 9 0
⅝ ¾ ⅞ ...	"	2 7 0	3 0 0	3 15 0
½ ⅝ ¾ ⅞ ...	"	2 16 0	3 11 0	4 10 0
7/16 ½ ⅝ ¾ ⅞	"	3 7 6	4 5 0	5 6 0
¾ ⅞ 1 ...	"	2 16 0	3 11 0	4 9 0
⅝ ¾ ⅞ 1 ...	"	3 7 0	4 5 0	5 8 0
½ ⅝ ¾ ⅞ 1 ...	"	3 17 0	4 18 0	6 3 0
⅞ 1 1⅛ ...	"	3 4 0	4 2 0	5 3 0
¾ ⅞ 1 1⅛ ...	"	3 16 0	4 18 0	6 5 0
⅝ ¾ ⅞ 1 1⅛ ...	"	4 8 0	5 14 0	7 4 0
1 1⅛ 1¼ ...	"	3 6 0	4 6 0	5 10 0
⅞ 1 1⅛ 1¼ ..	"	3 19 0	5 4 0	6 14 0
¾ ⅞ 1 1⅛ 1¼	"	4 12 6	6 2 0	7 18 0
1¼ 1⅜ 1½ ...	"	4 14 0	6 1 0	7 13 0
1⅛ 1¼ 1⅜ 1½	"	5 13 0	7 6 0	9 6 0
1 1⅛ 1¼ 1⅜ 1½	"	6 12 0	8 11 0	10 18 0
1½ 1⅝ 1¾ ...	"	6 19 0	8 18 0	11 1 0
1⅜ 1½ 1⅝ 1¾	"	8 3 0	10 12 0	13 5 0
1¼ 1⅜ 1½ 1⅝ 1¾	"	9 6 0	12 3 0	15 5 0
1¾ 1⅞ 2 ...	"	9 3 0	11 15 0	14 12 0
1⅝ 1¾ 1⅞ 2 ...	"	10 10 0	13 15 0	17 6 0
1½ 1⅝ 1¾ 1⅞ 2	"	11 10 0	15 6 0	19 9 0

For the above Stocks and Dies in Cases see page 228.

PATENT DIRECT-ACTION

GUIDE STOCKS AND DIES

For Engineers, Whitworth's Pitch.



No. 60

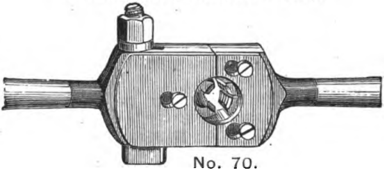
TO SCREW		With Taper and Plug Tap to each size			With Taper, Second, and Plug Tap to each size			With Taper, Second, Plug and Master Tap to each size		
		£	s.	d.	£	s.	d.	£	s.	d.
¼ 5/16 ⅜ ...	ins.	1	17	0	2	4	6	2	11	0
¼ ⅜ ½ ...	"	1	18	6	2	7	6	2	15	0
¼ 5/16 ⅜ ½ ...	"	2	7	0	2	17	0	3	7	0
¼ 5/16 ⅜ 7/16 ½	"	3	3	0	3	16	0	4	9	0
⅜ ½ ⅝ ...	"	2	4	0	2	14	6	3	4	0
¼ ⅜ ½ ⅝ ...	"	2	14	6	3	7	0	3	19	0
¼ 5/16 ⅜ ½ ⅝	"	3	4	0	3	18	0	4	12	0
½ ⅝ ¾ ...	"	2	14	0	3	7	0	3	19	0
⅜ ½ ⅝ ¾ ...	"	3	7	6	4	2	6	4	17	0
⅜ 7/16 ½ ⅝ ¾	"	3	19	0	4	16	0	5	14	0
⅝ ¾ ⅞ ...	"	3	3	0	3	18	0	4	13	0
½ ⅝ ¾ ⅞ ...	"	3	17	0	4	16	0	5	14	0
7/16 ½ ⅝ ¾ ⅞	"	4	10	6	5	11	0	6	12	0
¾ ⅞ 1 ...	"	3	18	6	4	16	6	5	14	0
⅝ ¾ ⅞ 1 ...	"	4	10	6	5	12	6	6	15	0
½ ⅝ ¾ ⅞ 1 ...	"	5	4	0	6	9	6	7	15	0
⅞ 1 1⅛ ...	"	4	5	0	5	5	0	6	6	0
¾ ⅞ 1 1⅛ ...	"	5	2	0	6	10	0	7	16	0
⅝ ¾ ⅞ 1 1⅛...	"	6	0	0	7	9	0	8	19	0
1 1⅛ 1¼ ...	"	4	16	0	6	0	0	7	4	0
⅞ 1 1⅛ 1¼ ...	"	5	10	0	6	17	0	8	7	0
¾ ⅞ 1 1⅛ 1¼	"	6	8	0	8	3	0	9	18	0
1¼ 1⅜ 1½ ...	"	6	4	0	7	12	6	9	4	0
1⅛ 1¼ 1⅜ 1½	"	7	12	0	9	8	0	11	8	0
1 1⅛ 1¼ 1⅜ 1½	"	8	18	0	11	1	0	13	8	0
1½ 1⅝ 1¾ ...	"	8	18	0	10	17	0	12	19	0
1⅜ 1½ 1⅝ 1¾	"	10	13	0	13	3	0	15	16	0
1¼ 1⅜ 1½ 1⅝ 1¾	"	11	17	0	14	17	0	17	19	0
1¾ 1⅞ 2 ...	"	11	2	0	13	18	0	16	14	0
1⅝ 1¾ 1⅞ 2 ...	"	12	10	0	16	0	0	19	10	0
1½ 1⅝ 1¾ 1⅞ 2	"	14	10	0	18	10	0	22	13	0

For the above Stocks and Dies in Cases see page 229.

WHITWORTH'S PATENT

GUIDE STOCKS AND DIES

For Engineers, Whitworth's Pitch.



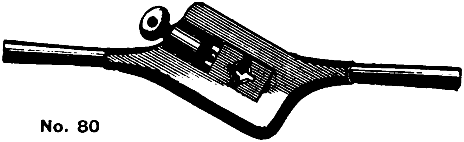
No. 70.

To Screw		With Taper and Plug Tap to each size			With Taper, Second, and Plug Tap to each size			With Taper, Second Plug and Master Tap to each size		
		£	s.	d.	£	s.	d.	£	s.	d.
¼ 5/16 ⅜ ...	ins.	2	15	0	3	2	0	3	10	0
¼ ⅜ ½ ...	"	3	0	0	3	7	6	3	16	0
¼ 5/16 ⅜ ½ ...	"	3	10	0	4	0	0	4	11	0
¼ 5/16 ⅜ 7/16 ...	"	4	1	0	4	13	6	5	8	0
⅜ ½ ⅝ ...	"	3	10	0	4	0	0	4	11	0
¼ ⅜ ½ ⅝ ...	"	4	1	0	4	13	0	5	7	0
¼ 5/16 ⅜ ½ ⅝ ...	"	4	12	0	5	6	0	6	2	0
½ ⅝ ¾ ...	"	4	0	0	4	12	6	5	7	0
⅜ ½ ⅝ ¾ ...	"	4	13	6	5	8	6	6	6	0
⅜ 7/16 ½ ⅝ ¾ ...	"	5	7	0	6	4	6	7	5	0
⅝ ¾ ⅞ ...	"	4	10	0	5	5	0	6	3	0
½ ⅝ ¾ ⅞ ...	"	5	6	0	6	4	0	7	5	0
7/16 ½ ⅝ ¾ ⅞ ...	"	6	1	6	7	2	0	8	6	0
¾ ⅞ 1 ...	"	5	0	0	5	17	6	6	18	0
⅝ ¾ ⅞ 1 ...	"	5	19	6	7	1	0	8	7	0
½ ⅝ ¾ ⅞ 1 ...	"	6	17	0	8	2	0	9	11	0
⅞ 1 1⅛ ...	"	6	0	0	7	1	0	8	5	0
¾ ⅞ 1 1⅛ ...	"	7	2	6	8	7	6	9	18	0
⅝ ¾ ⅞ 1 1⅛ ...	"	8	3	6	9	13	0	11	8	0
1 1⅛ 1¼ ...	"	6	10	0	7	13	6	9	1	0
⅞ 1 1⅛ 1¼ ...	"	7	15	6	9	4	6	10	19	0
¾ ⅞ 1 1⅛ 1¼ ...	"	9	0	0	10	13	6	12	14	0
1¼ 1⅜ 1½ ...	"	7	17	0	9	8	0	11	5	0
1⅛ 1¼ 1⅜ 1½ ...	"	9	10	0	11	9	0	13	15	0
1 1⅛ 1¼ 1⅜ 1½	"	11	1	0	13	6	0	16	0	0
1½ 1⅝ 1¾ ...	"	11	10	0	13	11	0	16	0	0
1⅜ 1½ 1⅝ 1¾ ...	"	13	10	0	16	2	0	19	4	0
1¼ 1⅜ 1½ 1⅝ 1¾	"	15	7	0	18	7	0	21	19	0
1¾ 1⅞ 2 ...	"	13	0	0	15	15	0	19	1	0
1⅝ 1¾ 1⅞ 2 ...	"	15	10	0	18	19	0	23	1	0
1½ 1⅝ 1¾ 1⅞ 2	"	17	15	0	21	15	0	26	11	0

For the above Stocks and Dies in Cases, see page 229.

STOCKS, DIES, AND TAPS

For Screwing Iron, Gas, and Steam Tube, with Taper and Plug Tap to each size.

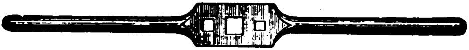


No. 80

To Screw	£	s.	To Screw	£	s.
⅛ ¼ ⅜ … … ins.	1	7	½ ¾ 1 1¼ … … ins.	5	0
⅛ ¼ ⅜ ½ … … "	2	6	¾ 1 1¼ … … "	4	4
¼ ⅜ ½ … … "	1	18	¾ 1 1¼ 1½ … … "	7	7
¼ ⅜ ½ ¾ … … "	3	4	1 1¼ 1½ … … "	6	10
⅜ ½ ¾ … … "	2	16	1 1¼ 1½ 2 … … "	9	5
⅜ ½ ¾ 1 … … "	3	17	1¼ 1½ 2 … … "	8	0
½ ¾ 1 … … "	3	3	1½ 1¾ 2 … … … "	8	14

Sets of the above can be had in deal or Oak Cases at an extra charge.

BEST TAP WRENCHES



For Engineers' Taps				For Gas Taps			
To take	Price	To take	Price	To take	Price	To take	Price
¼ 5/16 ⅜ ins.	4/-	1 1⅛ ins.	11/-	⅛ ¼ ⅜ ins.	10/-	1¼ 1½ 2 ins.	33/-
⅜ 7/16 "	5/-	1⅛ 1¼ "	12/-	¼ ⅜ ½ "	12/-	1½ 1¾ 2 "	33/-
7/16 ½ "	5/-	1¼ 1½ "	16/-	⅜ ½ ¾ "	13/-	2¼ 2½ "	40/-
½ ⅝ "	6/-	1⅜ 1½ "	16/-	½ ¾ 1 "	16/-	2¾ 3 "	48/-
⅝ ¾ "	7/6	1⅝ 1¾ "	20/-	¾ 1 1¼ "	19/-	2¼ 2½ 3 "	56/-
¾ ⅞ "	9/-	1⅞ 2 "	24/-	1 1¼ 1½ "	25/-		
⅞ 1 "	10/-	2 2¼ "	28/-				

ENGINEERS' SCREW TOOLS

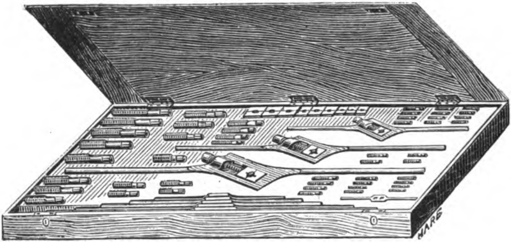
Whitworth's Thread.

¼	5/16	⅜	7/16	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½	1⅝	1¾	1⅞	2	ins.
3/-	3/-	3/-	3/-	3/3	3/6	4/-	4/6	4/9	5/-		5/6		6/-		6/6		pair

SETS OF STOCKS, DIES, AND TAPS

For Engineers, Whitworths' Pitch. In Solid Oak Cases.

PATTERN No. 50



RANGE OF SIZES		With taper and plug tap to each size and tap wrenches	With taper 2nd and plug tap to each size and tap wrenches	With taper 2nd plug and master tap to each size & tap wrenches
Set No.	TO SCREW			
0000	1/4 3/8 1/2 5/8 3/4 7/8 1 ... ... ins.	£7 8	£8 14	£10 6
000	1/4 5/16 3/8 7/16 1/2 5/8 3/4 7/8 1 ... ... "	8 11	10 1	11 19
00	1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/8 1 1/4 ... ... "	10 7	12 9	14 19
0	1/4 5/16 3/8 7/16 1/2 5/8 3/4 7/8 1 1 1/8 1 1/4 ... "	12 1	14 6	17 2
1	1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/8 1 1/4 1 3/8 1 1/2 ... "	15 13	18 16	22 11
2	1/4 5/16 3/8 7/16 1/2 5/8 3/4 7/8 1 1 1/8 1 1/4 1 3/8 1 1/2 "	16 17	20 4	24 5
3	1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/8 1 1/4 1 3/8 1 1/2 1 3/4 2... "	25 14	30 18	36 15
4	1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/8 1 1/4 1 3/8 1 1/2 1 5/8 1 3/4 1 7/8 2 ... ... "	31 6	38 0	45 14
5	1/4 5/16 3/8 7/16 1/2 5/8 3/4 7/8 1 1 1/8 1 1/4 1 3/8 1 1/2 1 5/8 1 3/4 1 7/8 2 ... ... "	32 10	39 8	47 7

Sets 0000 to 2 inclusive are each fitted in one solid oak case.
Sets 3, 4, and 5 are each fitted in two solid oak cases.

Any of the above sets can be fitted in deal cases at a little less cost, but are not recommended for exportation.

SETS OF PATENT DIRECT-ACTION

GUIDE STOCKS AND DIES, No. 60

For Engineers. In Solid Oak Cases.

RANGE OF SIZES			With taper and plug tap to each size and tap wrenches	With taper 2nd and plug tap to each size and tap wrenches	With taper 2nd plug and master tap to each size & tap wrenches
Set No.	TO SCREW				
0000	¼ ⅜ ½ ⅝ ¾ ⅞ 1	ins.	£9 1	£10 14	£12 5
000	¼ 5⁄16 ⅜ 7⁄16 ½ ⅝ ¾ ⅞ 1	"	10 12	12 8	14 5
00	¼ ⅜ ½ ⅝ ¾ ⅞ 1 1⅛ 1¼	"	12 18	15 7	17 17
0	¼ 5⁄16 ⅜ 7⁄16 ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ ...	"	14 16	17 9	20 4
1	¼ ⅜ ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ 1⅜ 1½ ...	"	19 5	22 17	26 13
2	¼ 5⁄16 ⅜ 7⁄16 ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ 1⅜ 1½	"	20 16	24 13	28 14
3	¼ ⅜ ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ 1⅜ 1½ 1¾ 2...	"	30 5	36 3	42 0
4	¼ ⅜ ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ 1⅜ 1½ 1⅝ 1¾ 1⅞ 2	"	36 17	44 7	52 0
5	¼ 5⁄16 ⅜ 7⁄16 ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ 1⅜ 1½ 1⅝ 1¾ 1⅞ 2	"	38 9	46 3	54 0

SETS OF WHITWORTH'S PATENT

GUIDE STOCKS AND DIES, No. 70

For Engineers. In Solid Oak Cases.

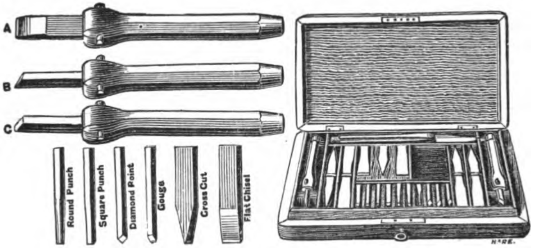
RANGE OF SIZES			With taper and plug tap to each size and tap wrenches	With taper 2nd and plug tap to each size and tap wrenches	With taper 2nd plug and master tap to each size & tap wrenches
Set No.	TO SCREW				
0000	¼ ⅜ ½ ⅝ ¾ ⅞ 1	ins.	£12 0	£13 10	£15 7
000	¼ 5⁄16 ⅜ 7⁄16 ½ ⅝ ¾ ⅞ 1	"	13 8	15 3	17 5
00	¼ ⅜ ½ ⅝ ¾ ⅞ 1 1⅛ 1¼	"	17 9	19 16	22 14
0	¼ 5⁄16 ⅜ 7⁄16 ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ ...	"	20 2	22 15	25 19
1	¼ ⅜ ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ 1⅜ 1½ ...	"	24 10	28 4	32 11
2	¼ 5⁄16 ⅜ 7⁄16 ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ 1⅜ 1½	"	25 19	29 18	34 10
3	¼ ⅜ ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ 1⅜ 1½ 1¾ 2...	"	37 15	43 8	50 5
4	¼ ⅜ ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ 1⅜ 1½ 1⅝ 1¾ 1⅞ 2	"	46 0	53 10	62 7
5	¼ 5⁄16 ⅜ 7⁄16 ½ ⅝ ¾ ⅞ 1 1⅛ 1¼ 1⅜ 1½ 1⅝ 1¾ 1⅞ 2	"	47 8	55 4	64 6

Sets 0000 to 2 inclusive are each fitted in one solid oak case.
Sets 3, 4, and 5 are each fitted in two solid oak cases.

Any of the above sets can be fitted in deal cases at a little less cost, but are not recommended for exportation.

TANGYES' CHIPPING-CHISEL HOLDERS

With Removable Cutters.



By the use of these Chisel Holders a great saving in workmen's time and cost of Chisels is effected.

The cutting portion of the Chisel is distinct from the Holder, and when blunted, can be removed therefrom and replaced by a new one in a few seconds; thus the cutters may be of the very best material for the purpose, and at slight cost, since they are of small dimensions, while the holder or heavy portion of the tool may be of a material more suitable for its purpose, though cheaper.

The cutters, when blunted, can be placed on one side for hardening and grinding at leisure, and fresh cutters substituted; the workman can carry a complete assortment of chisels with him in a very small space, and so reduce the weight of his tool chest.

The holders are supplied in three forms, viz: **A** suitable for Flat and Cross Cut Chisels. **B** suitable for Diamond Point Chisels, and Square and Round Punches. **C** suitable for Gouges.

Length of Holder	Price of Holder	Cutters for Holder A per doz.		Cutters for Holder B per doz.			Cutters for Holder C per doz.
		Flat	Cross Cut	Diam. Point	Square Punch	Round Punch	Gouges
Ins.	Each	Wide	Wide	Square			
5	5/-	⅝ 5/-	⅛ 3/16 ¼ … 5/-	¼ 5/-	3/16 5/-	3/16 5/-	⅛ 3/16 ¼ 5/-
6	6/-	¾ 6/-	¼ ⅜ ½ … 6/-	⅜ 5/6	¼ 5/6	¼ 5/6	¼ ⅜ ½ 5/6
7	7/-	1 7/-	½ ⅝ ¾ … 7/6	½ 6/6	⅜ 6/6	⅜ 6/6	½ ⅝ ¾ 7/6

In ordering state description of Holder required.

Polished Mahogany Boxes, with Lock and Key, containing Three 5 in. Holders (one of each description A. B. and C,) Six Flat Chisels ⅝ in. wide, Two Cross-cut Chisels, each ⅛ in., 3/16 in., and ¼ in. wide, Two Gouges each ⅛ in., 3/16 in., and ¼ in. wide, Four Diamond Point Cutters, ¼ in. square, and One each 3/16 in. Round and Square Punches.

PRICE £1 15s.

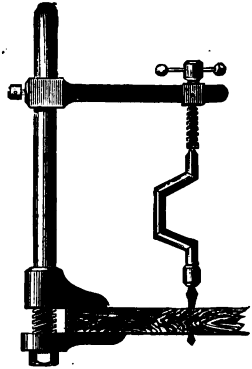
STRAIGHT LIP INCREASE TWIST DRILLS

With Taper Shanks and Patent Grinding Line.

Diameter of Drills	Length of Drill	Price per Drill	No. and Price of Sockets
1/4	6 1/8	2/-	No. 1 Sockets, 5/- each
9/32	6 1/4	2/1	
5/16	6 3/8	2/2	
11/32	6 1/2	2/3	
3/8	6 3/4	2/5	
13/32	7	2/7	
7/16	7 1/4	2/10	
15/32	7 1/2	3/1	
1/2	7 3/4	3/4	
17/32	8	3/8	
9/16	8 1/4	4/-	
19/32	8 1/2	4/4	
5/8	8 3/4	4/9	No. 2 Sockets, 6/6 each
21/32	9	5/2	
11/16	9 1/4	5/7	
23/32	9 1/2	6/1	
3/4	9 3/4	6/7	
25/32	10	7/1	
13/16	10	7/7	
27/32	10 1/2	8/1	
7/8	10 1/2	8/8	
29/32	10 1/2	9/3	
15/16	10 3/4	9/10	No. 3 Sockets, 8/6 each
31/32	"	10/5	
1	11	11/-	
1 1/32	"	11/7	
1 1/16	11 1/4	12/2	
1 3/32	"	12/9	
1 1/8	11 3/4	13/4	
1 5/32	"	14/-	
1 3/16	12	14/9	
1 7/32	"	15/6	
1 1/4	12 1/2	16/4	
1 5/16	14 1/4	18/-	No. 4 Sockets, 14/3 each
1 3/8	14 1/2	19/-	
1 7/16	14 3/4	21/6	
1 1/2	15	24/-	
1 9/16	15 1/4	31/6	
1 5/8	15 1/2	32/6	
1 11/16	15 3/4	33/8	
1 3/4	16	35/6	
1 13/16	16 1/4	38/-	
1 7/8	16 1/2	40/-	
1 15/16	"	41/8	
2	"	43/-	

Millimetres	PRICE	
6	2/-	No. 1 Socket, 5/- each
7	2/1	
8	2/2	
9	2/4	
10	2/7	
11	2/10	
12	3/2	
13	3/6	
14	3/11	
15	4/4	
16	4/10	No. 2 Socket, 6/6 each
17	5/4	
18	5/11	
19	6/6	
20	7/1	
21	7/9	
22	8/5	
23	9/2	
24	9/11	No. 3 Socket, 8/6 each
25	10/8	
26	11/5	
27	12/2	
28	12/11	
29	13/9	
30	14/7	
31	15/5	
32	16/3	
33	18/-	No. 4 Socket, 14/3 each
34	18/6	
35	19/-	
36	20/-	
37	21/9	
38	24/-	
39	31/-	
40	32/6	
41	33/6	
42	34/6	
43	35/8	
44	36/8	
45	37/9	
46	38/9	
47	40/-	
48	41/3	
49	42/3	
50	43/-	

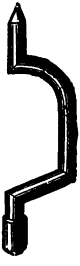
DRILLING PILLAR



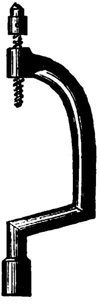
No. 1 Pillar,	$1\frac{3}{8}$ ins. diam.	28 ins. high	...	...	30/-
" 2 "	$1\frac{5}{8}$ "	31 "	...	...	35/-

Brace not included in price.

CRANK BRACES



9/- each

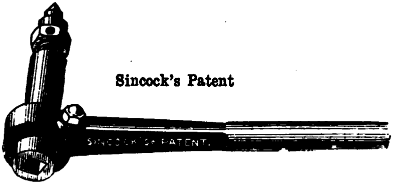


11/6 each

Cast Steel Drills for any of the above, 1¼ to 1½ ins. 12/- per doz.

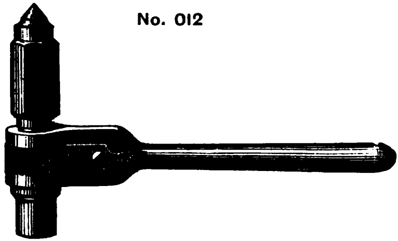
RATCHET BRACES

Sincock's Patent



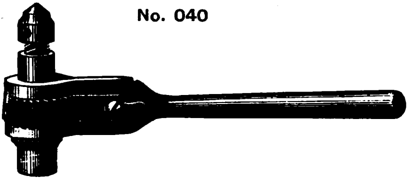
Price		
12 ins.	...	11/6
14 "	...	12/6
16 "	...	13/6
18 "	...	15/-
20 "	...	16/-
22 "	...	18/6

No. 012



Price		
10 ins.	...	15/-
12 "	...	17/-
14 "	...	20/-
16 "	...	22/-
18 "	...	25/-
20 "	...	28/-
22 "	...	30/-
24 "	...	32/-

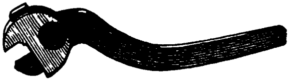
No. 040



Price		
10 ins.	...	15/-
12 "	...	17/-
14 "	...	20/-
16 "	...	22/-
18 "	...	25/-
20 "	...	28/-
22 "	...	30/-
24 "	...	32/-

Cast Steel Drills for any of the above assorted from ¼ to 1½ ins. 12/- per doz.

CLYBURN'S SHIFTING SPANNER

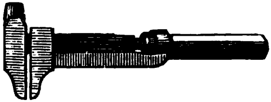


Length	Span	PRICE
8 ins.	¾ ins.	6/- each
10 "	1 "	7/6 "
12 "	1¼ "	9/6 "
15 "	1½ "	11/6 "
18 "	1¾ "	14/- "
20 "	2 "	16/6 "

BUDDING'S SHIFTING SPANNER

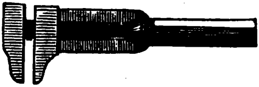
Length	Span	PRICE
8 ins.	1¼ ins.	7/- each
10 "	1½ "	8/6 "
12 "	1¾ "	10/- "
14 "	2 "	11/6 "
16 "	2¼ "	13/- "
18 "	2½ "	14/6 "
20 "	2¾ "	16/- "

SINGLE COACH WRENCH



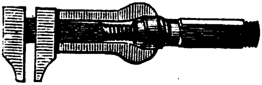
8 ins.	2/10	14 ins.	5/3
10 "	3/8	16 "	6/6
12 "	4/6	18 "	8/-

DOUBLE COACH WRENCH



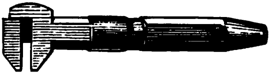
8 ins.	5/9	14 ins.	10/-
10 "	6/6	16 "	13/3
12 "	7/6	18 "	16/6

DOUBLE RAILWAY WRENCH



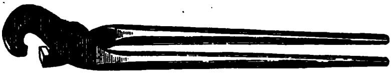
8 ins.	10/-	14 ins.	14/9
10 "	11/9	16 "	18/-
12 "	13/3	18 "	21/6

CYLINDER COACH WRENCH



8 ins.	6/6	14 ins.	11/9
10 "	8/-	16 "	14/6
12 "	9/8	18 "	17/6

GAS PIPE TONGS

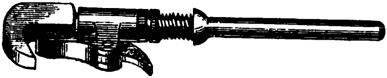


Sizes	¼	⅜	½	¾	1	1¼	1½	2	2¼	2½	ins.
For Pipe	17/-	21/6	25/6	30/-	35/-	42/-	56/-	65/-	73/-	82/-	doz.
" Socket	25/-	26/-	30/-	35/-	42/-	53/-	59/-	72/-	81/-	90/-	"

SELF-ADJUSTING PIPE WRENCH

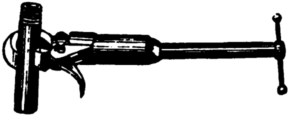
No.	0	1	2	3	4	5
Sizes, Pipe and Socket	⅛ to ½	¼ to ¾	½ to 1¼	1 to 2	1¼ to 2¼	1½ to 3 ins.
Price	5/6	7/-	9/-	12/-	18/-	22/- each

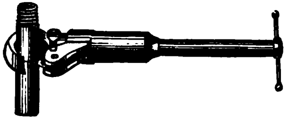
ADJUSTABLE PIPE WRENCH



No.	0	1	2	3
Sizes, Pipe and Socket	⅛ to ⅜	¼ to ¾	½ to 1	1 to 2 ins.
Price	7/-	8/-	10/-	14/- each

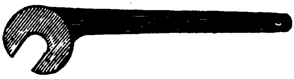
COMBINED PIPE WRENCH AND CUTTER





No. 1,	for ¼ in. to 1 in. Tube,	16/6 ...	Extra Cutters,	1/- each.
" 2,	" 1¼ " 2 " "	26/- ...	" "	1/6 "
" 3,	" 2¼ " 3½ " "	36/6 ...	" "	1/6 "

TANGYES' WROUGHT SINGLE SPANNERS



No.	To fit hexagon headed bolts	Length	PRICE lacquered	PRICE bright jaws and shafts lacquered
132	¼ ins.	8 ins.	1/2 ea.	1/4 ea.
133	5/16 "	8 "	1/4 "	1/6 "
134	⅜ "	8 "	1/6 "	1/8 "
135	7/16 "	10½"	2/- "	2/2 "
136	½ "	10½"	2/3 "	2/6 "
137	9/16 "	10½"	2/6 "	3/- "
138	⅝ "	10½"	3/- "	3/4 "
139	11/16"	14 "	3/4 "	3/9 "
140	¾ "	15 "	3/4 "	4/3 "
141	⅞ "	15 "	5/- "	6/- "
142	1 "	17 "	5/9 "	6/9 "
143	1⅛ "	19 "	6/3 "	7/3 "
144	1¼ "	21 "	6/9 "	7/9 "
145	1⅜ "	21 "	7/3 "	8/6 "

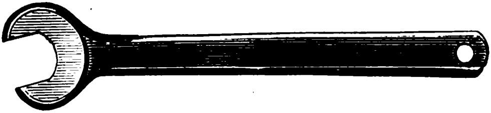
WROUGHT DOUBLE SPANNERS

No.	To fit hexagon headed bolts	Length	PRICE lacquered	PRICE bright jaws and shafts lacquered
132	¼ × 5/16 ins.	8 ins.	1/4 ea.	1/8 ea.
133	5/16 × ⅜ "	8 "	1/6 "	2/- "
134	⅜ × 7/16 "	8 "	1/8 "	2/3 "
135	7/16 × ½ "	10½ "	2/3 "	3/4 "
136	½ × 9/16 "	10½ "	2/6 "	3/9 "
137	9/16 × ⅝ "	10½ "	3/- "	4/3 "
138	⅝ × 11/16 "	10½ "	3/4 "	4/3 "
139	11/16 × ¾ "	14 "	3/9 "	5/9 "
140	¾ × ⅞ "	15 "	4/3 "	6/9 "
141	⅞ × 1 "	15 "	5/9 "	8/6 "
142	1 × 1⅛ "	17 "	6/9 "	9/3 "
143	1⅛ × 1¼ "	19 "	7/3 "	11/- "
144	1¼ × 1⅜ "	21 "	7/6 "	12/- "
145	1⅜ × 1½ "	21 "	8/6 "	13/6 "

TANGYES' MALLEABLE DOUBLE SPANNERS

No	Width Jaw	Length	No.	Width Jaw	Length
75	¼ ins. and ⅜	6 ins.	89	1⅛ ins. and 1¼	13 ins.
76	¼ " ½	6 "	90	1⅛ " 1⅜	14 "
77	⅜ " ½	6¼ "	91	1¼ " 1⅜	15 "
78	⅜ " ⅝	6¼ "	92	1¼ " 1½	15½ "
79	½ " ⅝	7½ "	93	1⅜ " 1½	16 "
80	½ " ¾	7½ "	94	1⅜ " 1⅝	16½ "
81	⅝ " ¾	8¼ "	95	1½ " 1⅝	17 "
82	⅝ " ⅞	8½ "	96	1½ " 1¾	17½ "
83	¾ " ⅞	9½ "	97	1⅝ " 1¾	18 "
84	¾ " 1	10 "	98	1⅝ " 1⅞	18½ "
85	⅞ " 1	10½ "	99	1¾ " 1⅞	19 "
86	⅞ " 1⅛	10½ "	100	1¾ " 2	19 "
87	1 " 1⅛	11½ "	101	1⅞ " 2	19½ "
88	1 " 1¼	12½ "			

TANGYES' MALLEABLE SINGLE SPANNERS



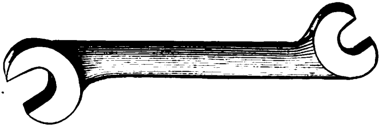
No.	Width Jaw	Length	No.	Width Jaw	Length
102	¼ ins.	5½ ins.	115	1⅞ ins.	17½ ins.
103	⅜ "	5½ "	116	2 "	18 "
104	½ "	7½ "	117	2⅛ "	19 "
105	⅝ "	8½ "	118	2¼ "	20 "
106	¾ "	9 "	119	2⅜ "	21 "
107	⅞ "	9½ "	120	2½ "	22 "
108	1 "	11 "	121	2¾ "	24 "
109	1⅛ "	11½ "	122	3 "	26 "
110	1¼ "	14 "	123	3¼ "	30½ "
111	1⅜ "	15 "	124	3½ "	32½ "
112	1½ "	15½ "	125	4 "	34 "
113	1⅝ "	16 "	126	4⅜ "	34 "
114	1¾ "	17 "			

Quotations on Application.

TANGYES

MALLEABLE DOUBLE SPANNERS

To fit Whitworth Nuts.



Set A

No.	To fit Hexagon Headed Bolts, diam.	Length
29	¼ ins. and ⅜ ins.	8 ins.
30	½ " ⅝ "	10½ "
31	¾ " ⅞ "	15 "
32	1 " 1⅛ "	17 "
33	1¼ " 1⅜ "	21 "
34	1½ " 1⅝ "	24 "
35	1 11/16 " 1¾ "	28 "
36	1¾ " 1⅞ "	29 "

Set B

No.	To fit, Hexagon Headed Bolts, diam.	Length
38	⅜ ins. and ½ ins.	10 ins.
39	⅝ " ¾ "	12 "
40	⅞ " 1 "	17 "
41	1⅛ " 1¼ "	19 "
42	1⅜ " 1½ "	23 "
43	1⅝ " 1¾ "	26 "
44	1⅞ " 2 "	30 "

In ordering complete sets, a reference to A or B will be sufficient.

TANGYES' MALLEABLE

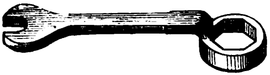
BOX SPANNERS OR SCREW KEYS

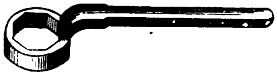
No.	Size	Length	No	Size	Length
1	⅜ ins.	6¾ ins.	9	1¼ ins.	15 ins.
2	7/16 "	6¾ "	10	1⅜ "	17 "
3	½ "	7½ "	11	1½ "	19 "
4	⅝ "	8¼ "	12	1⅝ "	21 "
5	¾ "	9 "	13	1¾ "	22¼ "
6	⅞ "	9½ "	14	2 "	24½ "
7	1 "	9½ "	15	2¼ "	25½ "
8	1⅛ "	10½ "	16	2½ "	27 "

Quotations on application.

TANGYES' MALLEABLE

AXLE CAP AND CARRIAGE SPANNERS

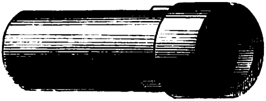




No.	Width Jaw	To fit caps	Length
1	7/8 ins.	2 1/8 ins.	8 1/2 ins.
2	7/8 "	2 1/4 "	9 "
3	1 1/16 "	2 3/8 "	9 3/4 "
4	1 1/16 "	2 1/2 "	9 3/4 "
5	1 1/16 "	2 5/8 "	10 "
6	1 1/16 "	2 3/4 "	10 1/2 "
7	1 3/16 "	2 7/8 "	10 1/2 "
8	1 3/16 "	3 "	10 1/2 "
9	1 3/16 "	3 1/8 "	11 "

TANGYES'

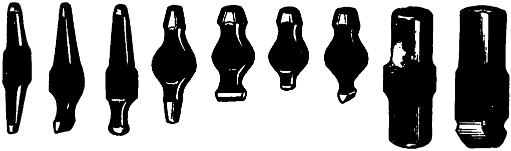
COACH AND CART AXLE BUSHES



These are not of Malleable Iron but of a special mixture for the trade.

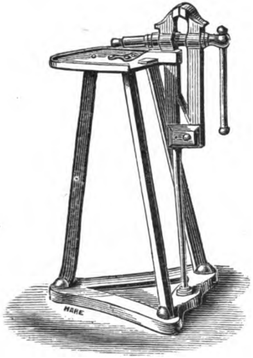
Quotations on application

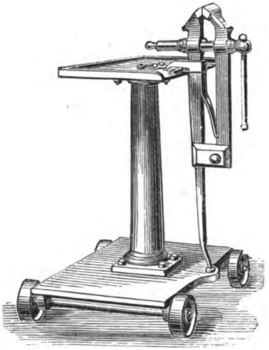
ENGINEERS', SMITHS', BOILER MAKERS' AND PLATELAYERS' TOOLS



Hand Hammers, Iron and Steel	6d.	per lb.
" Solid Cast Steel	1/-	"
Sledge Hammers, Iron and Steel	6d.	"
" Solid Cast Steel	1/-	"
Hot or Cold Sets, C.S.	1/-	"
Set Hammers	10d.	"
Punches and Mandrels, C.S.	1/-	"
Rounding Tools	10d.	"
Fullers and Necking Tools	10d.	"
Fire Tongs, close or open mouth, and Hollow Bit	5d.	"
Firing Tools	5d.	"
Iron Squares...	12/-	per doz.

PORTABLE BENCH VICES



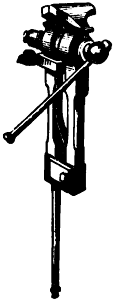


Size and Weight of Vice		Price
3½ in. Jaw	30 lbs.	34/-
4½ "	40 "	44/9

Size and Weight of Vice		Price
4¼ in. Jaw	40 lbs.	48/-
4½ "	55 "	58/9
5 "	70 "	65/-
5½ "	85 "	74/6
6 "	100 "	85/-

STAPLE VICES

Black Staple, with Patent Solid Wrought-iron Box	4½d.	per lb.
Bright " "	... 5d.	"
Spherical Washer,	... 5d.	"
Movable Staples ...	... 5d.	"

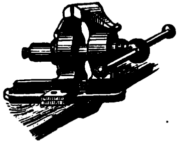


STAPLE VICE

PARALLEL VICES

Made entirely of Wrought-iron.

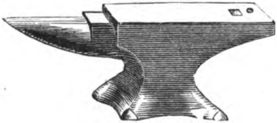
4 in. Jaw	32/-		6 in. Jaw	62/-
4½ " "	40/-		7 " "	80/-
5 " "	47/-		8 " "	96/-



PARALLEL VICE

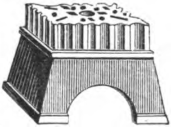
SMITHY APPLIANCES

SMITHS' ANVILS



Best Single Bick ...	29/6	per cwt.
" Double " ...	30/9	"
Soho Pattern	34/9	"
Cast-iron Anvil Stands	12/-	"

SWAGE BLOCKS

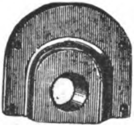


Size	Weight	Price
13×13×5 ins.	1¾ cwts.	10/9 per cwt.
16×16×6 "	2¼ "	10/9 "
20×20×7 "	4½ "	10/9 "

Stands for Swage Blocks 12/- per cwt.

HEARTH BACKS

With Nuts, Pins, &c.

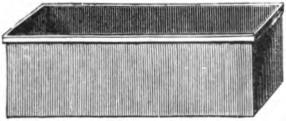


Wide	Deep	Price
12 ins.	13 ins.	4/4
13 "	14 "	5/-
15 "	16 "	6/4
18 "	19 "	9/9

Made to suit any of the Water Tue Irons.

SMITHY APPLIANCES

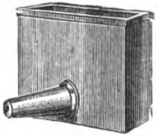
SLAKE TROUGHS



Size	Price
30 × 12 × 17 ins.	23/6
36 × 12 × 12 "	24/9
36 × 18 × 18 "	34/9
42 × 16 × 18 "	38/9

WATER TUE IRON

With Cistern.

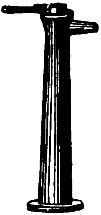


Length	Depth	Width	Price
21 ins.	21 ins.	7 ins.	20/-
24 "	23 "	8¾ "	26/6
27 "	25 "	10½ "	33/9

If made to suit a right or left-hand Smiths' Hearth 7/- each extra.

BLAST STANDARD

With Cock.



24/- each

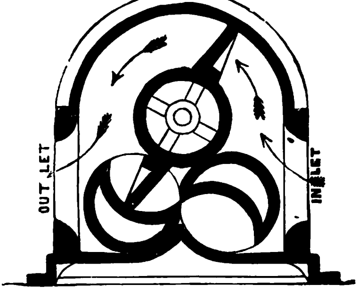
MANDRELS

Size	Price
30 × 4 × 12 ins.	30/9
37 × 4 × 18 "	38/6
48 × 4 × 20 "	45/-

ROTARY PRESSURE BLOWER

(Baker's Patent)

FOR CUPOLAS SMITHS' FIRES, VENTILATING, &c



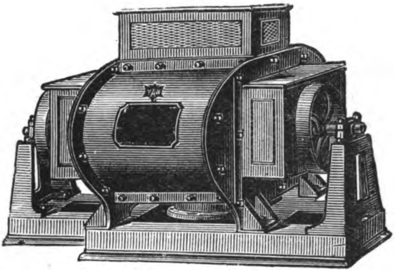
SECTION OF BLOWER

No.	Displacement in Cubic Feet per Revolution	Price	If with Steel Shaft and adjustable Brass-lined Bearings, Extra	Escape Valve Extra
1½	1½	£27	... ...	... ...
3	3	38	... ...	£1 10 0
6	6	56	£3 0 0	2 5 0
9	9	67	3 10 0	2 8 0
13	13	86	5 0 0	3 5 0
17	17	98	6 0 0	3 10 0
25	25	128	7 0 0	3 15 0
30	30	148	9 0 0	4 0 0
45	45	240	11 10 0	5 15 0
60	60	286	14 10 0	7 10 0
100	100	456	20 10 0	9 10 0

When Blowers are used for Smiths' Fires, an Escape Valve is necessary.

IMPROVED ROTARY BLOWER

(Root's Patent)



No.	No. Smiths' fires blown	Tons Metal melted per hour	Max. revs. per min.	Diam. delivery outlet	Weight	Diam. Pulleys	Width Pulleys	Price	Escape Valve extra
2A	4	½	350	5 ins.	4½ cwt.	8 ins.	2½ ins.	£20	30/-
1A	6	¾	350	6 "	6½ "	10 "	3 "	25	30/-
1	10	1	400	7 "	7½ "	10 "	3 "	30	30/-
2	18	2½	400	8 "	10¾ "	12 "	4 "	40	45/-
3	30	4	380	10 "	14½ "	14 "	5 "	50	45/-
4	50	7	350	12 "	26 "	16 "	6 "	70	60/-
5	70	10	320	13½ "	30 "	18 "	7 "	90	60/-
6	90	15	310	17 "	47 "	20 "	9 "	100	80/-
7	120	20	300	19 "	57 "	22 "	10 "	135	80/-

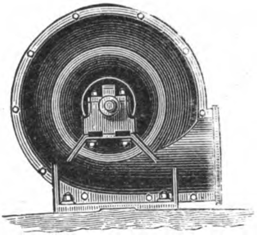
Escape Valve is required on Conducting Pipe when Blower is used for Smiths' fires.

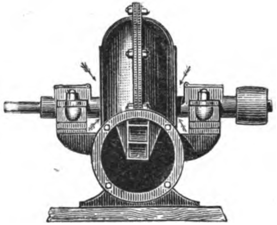
IMPROVED SMALL POWER BLOWERS

(Root's Patent.)

No.	Adapted to Work	Maximum Speed	Quantity of air delivered per min. in cubic feet	Diam. Pulley	Width Pulley	Diam. Outlet	Price	Extra Bracket and Loose Pulley
A 1	Small Fire	300	20	3 ins.	1¾	1½ ins.	£5	5/-
B 2	Blacksmith's Fire	300	35	3 "	2	1¾ "	7	7/-
C 3	Large Fire	300	65	4 "	2¼	2 "	9	10/-
D 4	Two Small Fires	300	90	4 "	2¼	2½ "	11	11/-
E 5	Two Large Fires	300	180	5 "	2¾	3 "	13	13/-

IMPROVED SILENT BLOWING FAN

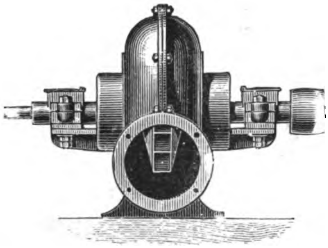


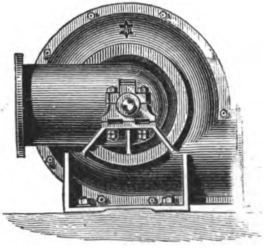


This Fan is fitted with steel spindles, has extra long bearings, and efficient lubrication.

No. of Fires	Diam. Revolving Fan	Diam. Discharge	Tons Melted per Hour	Revolutions per Min.	Diam. Pulleys	Width Straps	Price
1	9 ins.	2½ ins.	...	...	1½ ins.	...	£1 16 0
2	10 "	3½ "	...	...	2 "	...	3 0 0
4	10 "	5 "	...	4000 to 4500	2 "	...	3 10 0
6	12 "	6 "	...	3500 " 4200	3 "	...	4 10 0
8	15 "	8 "	1	3000 " 4000	4 "	1½	5 10 0
12	17½ "	9 "	1½	2800 " 3500	5 "	2¼	7 0 0
16	20 "	10 "	2	2500 " 3300	6 "	3	9 0 0
24	25 "	12 "	3	2000 " 2500	8 "	3¼	13 0 0
32	30 "	14 "	5	1500 " 2000	9 "	3½	16 0 0
52	36 "	16 "	7½	1300 " 1700	10 "	4	22 0 0
72	40 "	18 "	10	1200 " 1500	12 "	4½	28 0 0
150	50 "	22 "	20	900 " 1100	15 "	5	44 0 0

EXHAUSTING AND VENTILATING FAN

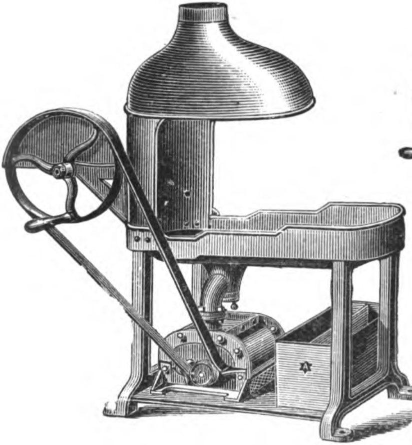


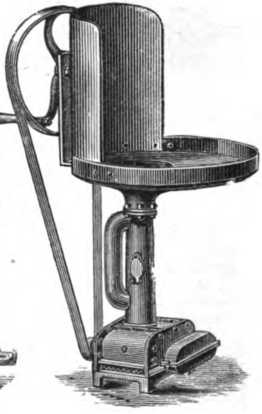


This is similar in construction to the Blowing Fan on previous page. The suction case is of cast iron, fitted with flanges, to which piping may be attached for the conveyance of vapours, dust, fibres, &c., &c., from pits, rooms, sewers, or tunnels, from which it is necessary either to exhaust or ventilate, and as the bearings are outside the case they are not liable to injury from anything passing through the Fan.

Sizes.	Diam. Revolving Fan	Diam. Discharge	Diam. Pulleys	Width Straps	Revs. per min.	Cubic feet of air per min.	Price
No. 1	10 ins.	5 ins.	2 ins.	1½ ins.	4000	500	£4 10 0
" 1½	12 "	6 "	3 "	2 "	3300	750	5 10 0
" 2	15 "	8 "	4 "	2¼ "	2500	1000	7 0 0
" 2½	17½ "	9 "	5 "	2½ "	2300	1500	9 0 0
" 3	20 "	10 "	6 "	3 "	2000	2000	11 10 0
" 4	25 "	12 "	8 "	3¼ "	1700	3000	15 10 0
" 5	30 "	14 "	9 "	3½ "	1400	4000	20 0 0
" 6	36 "	16 "	10 "	4 "	1100	6000	27 0 0
" 7	40 "	18 "	12 "	4½ "	900	8000	35 0 0
" 8	50 "	22 "	15 "	5 "	700	15000	54 0 0

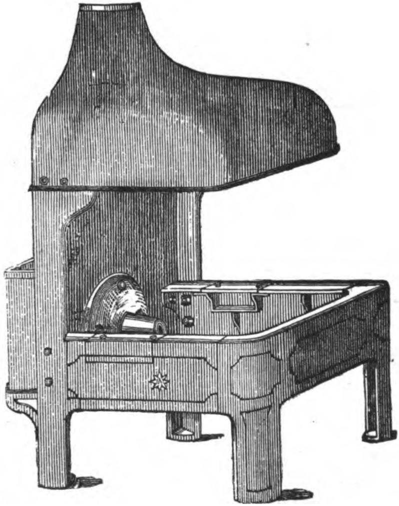
"CLIMAX" ROOT'S BLOWER CAST-IRON
PORTABLE FORGE


Nos. 10 and 11


No. 13

No.	Size of Hearth Plate	Price	Travelling Wheels extra	Weight
10	3 ft. 4 in. × 2 ft. 2 in.	£12 5 0	15/-	6 cwts.
11	2 " 6 " × 1 " 9 "	9 5 0	15/-	4 "
12	1 " 8 " × 1 " 2 "	6 5 0	...	2½ "
13	1 " 9 " × 1 " 3 "	4 15 0	...	1¾ "
13S	1 " 9 " × 1 " 3 "	5 15 0	...	2 "

SMITHS' HEARTH



This Hearth is complete in itself, being fitted with water bosh, tue iron, hearth back, and movable gap. It is adapted for either bellows or blast.

SINGLE SMITHS' HEARTH

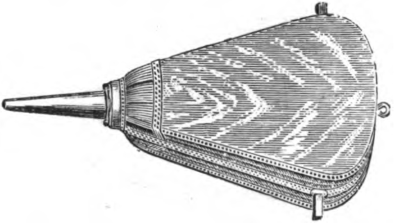
Width	Length	Height	Price
36 ins.	36 ins.	72 ins.	£9 13 6
42 "	42 "	72 "	11 2 9
48 "	48 "	72 "	12 13 6

DOUBLE SMITHS' HEARTH

72 ins.	48 ins.	72 ins.	£21 6 9

BEST WARRANTED SMITHS' BELLOWS

'Extra Leathered, and Double Nailed !

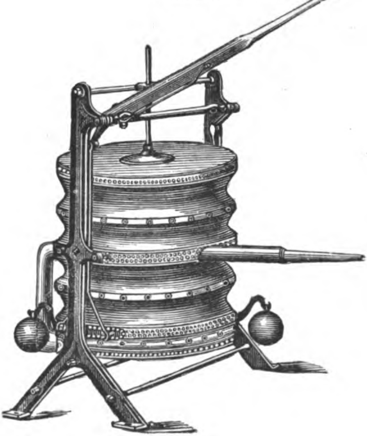


18 ins.	£1	12	0	26 ins.	£3	5	0	34 ins.	£6	17	0
20 "	1	18	0	28 "	3	16	0	36 "	8	16	0
22 "	2	6	0	30 "	4	12	0	38 "	11	0	0
24 "	2	14	0	32 "	5	10	0	40 "	13	16	0

Smiths' Bellows with Reversible Pipes, same list Prices.

DOUBLE-BLAST CIRCULAR BELLOWS

Mounted in strong **Iron Frames**

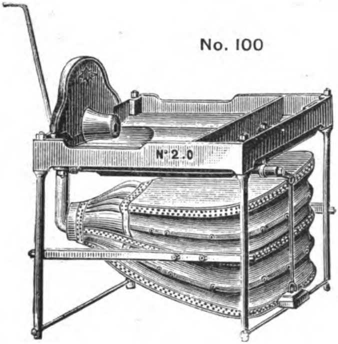


	Single Blast	Double Blast
20 ins.	96/-	132/-
22 "	107/-	154/-
24 "	120/-	176/-
26 "	139/-	198/-
28 "	162/-	230/-
30 "	181/-	268/-
32 "	...	300/-

Weights for the Double Blast Bellows extra.

IMPROVED PORTABLE FORGE

No. 100



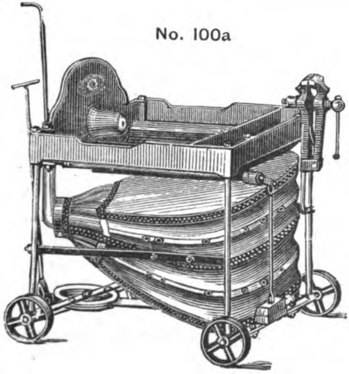
Size of pan		Size of Bellows	Price
Length	Width		
24 ins.	18 ins.	18 ins.	56/9
26 "	20 "	20 "	63/6
26 "	22 "	22 "	73/6
29 "	24 "	24 "	80/-
31 "	26 "	26 "	106/9

Extra if mounted on wheels 23/9

IMPROVED PORTABLE FORGE

With Vice attached and on wheels.

No. 100a



Size of pan		Size of Bellows	Price
Length	Width		
29 ins.	24 ins.	24 ins.	106/9
31 "	26 "	26 "	133/6

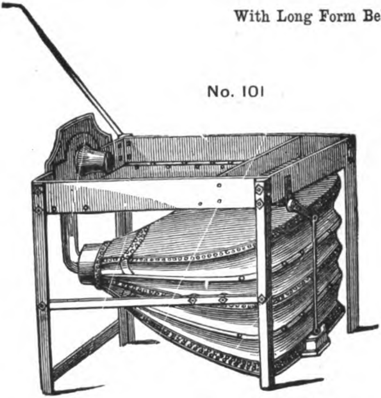
Vice extra.

Packing for Export 8/- to 10/- each extra.

WROUGHT-IRON PORTABLE FORGE

With Long Form Bellows

No. 101



Size of Pan		Size of Bellows	Price
Length	Width		
29ins.	24ins.	24 ins.	82/-
33 "	27 "	26 "	111/6
34 "	30 "	28 "	138/9

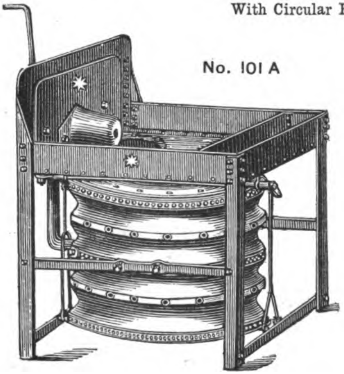
Packing for Export, 8/- to 12/- each.

Can be had with Hood if desired

WROUGHT-IRON PORTABLE FORGE

With Circular Bellows

No. 101 A



A very superior article, and great power of blast.

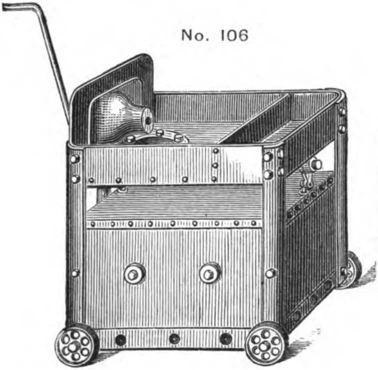
Size of Pan		Size of Bellows	Price
Length	Width		
29ins.	24ins.	24ins.	98/9
33 "	27 "	26 "	131/6
35 "	30 "	28 "	156/9

Packing for Export, 8/- to 12/- each.

IRON CASED PORTABLE FORGE

A first-class Forge for rough work and tropical climates.

No. 106



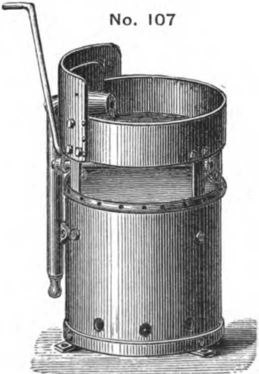
Length	Width	Height	Price
30 ins.	24 ins.	33 ins.	146/9
33 "	27 "	33 "	176/-
35 "	30 "	34 "	202/9

Packing Cases not required.

IRON CASED RIVET FORGE

A first-class Forge for rough work and tropical climates.

No. 107

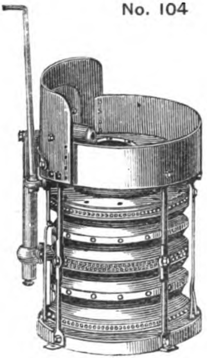


Width	Height	Size of Bellows	Price
17 ins.	29 ins.	14 ins.	54/9
19 "	29 "	16 "	57/6
21 "	29 "	18 "	62/9
23 "	29 "	20 "	74/-
25 "	29 "	22 "	78/-
27 "	29 "	24 "	92/-

Packing Cases not required.

WROUGHT-IRON RIVET FORGE

No. 104



Single Blast

Width	Height	Size of Bellows	Price
18 ins.	28 ins.	16 ins.	50/9
20 "	28 "	18 "	53/6
22 "	28 "	20 "	60/-
24 "	34 "	22 "	69/6
26 "	34 "	24 "	82/9

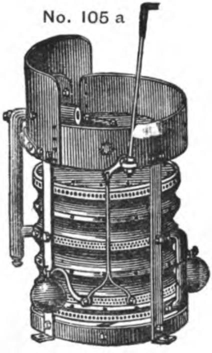
Extra Strong and Powerful, No. 105

Width	Height	Size of Bellows	Price
20 ins.	33 ins.	16 ins.	61/6
22 "	33 "	18 "	66/9
24 "	33 "	20 "	77/6
26 "	36 "	22 "	90/-
28 "	36 "	24 "	105/6
30 "	36 "	26 "	133/6

Packing for Export 7/- to 9/- each.

DOUBLE-BLAST RIVET FORGE

No. 105 a



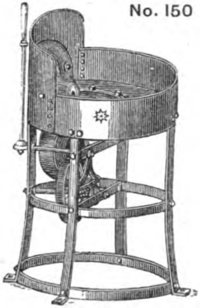
A very superior Forge, adapted for Ship and Bridge building, Dock Yards, Steam and other Ships. Possesses great power, and ensures rapid heat.

Height	34 ins.
Width	24 "
Double-blast Bellows ...	22 "
Price	120/-

Weights extra
Packing for Export 9/- each

NEW PATENT FAN FORGE

A newly invented and very superior Forge. Easy to work, and possesses great power and steadiness of blast. Being all iron it is well adapted for tropical climates.



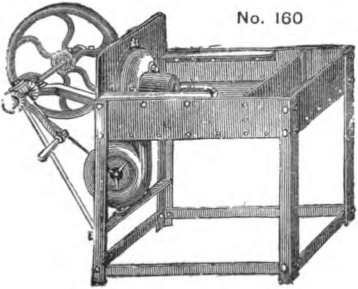
This Forge is supplied with Rotary motion, not with Lever as shown.

Diam.	Height	Price
20 ins.	30 ins.	66/9
24 "	32 "	80/-

If with Fire Screen, 4/9 extra.
" Water Cistern, 4/9 "
" Tool Chest, 5/6 "

PORTABLE FAN FORGE

An excellent Forge, simple in construction, easy to work, and very powerful Being all iron it is well adapted for tropical climates.

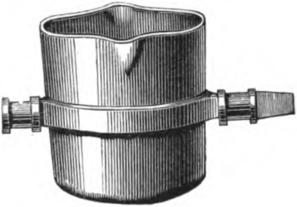


Length	Width	Height	Price
26 ins.	22 ins.	30 ins.	107/6
30 "	24 "	30 "	121/6
34 "	30 "	30 "	149/3

If with handle working at back of Forge (occupying less space) same price as above.

TANGYES'

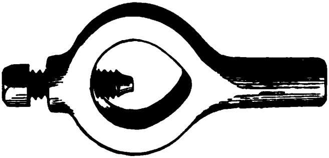
MALLEABLE CRANE LADLES



Made in several sizes, to carry from 10 to 80 cwts.

TANGYES'

MALLEABLE LATHE CARRIERS

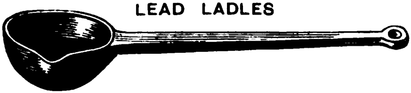


No. ...	1	2	3	4	5	6	7	8	9	10	11	12	13
Size ...	½	¾	1	1¼	1½	1¾	2	2½	3	3½	4	4½	5

Quotations on application.

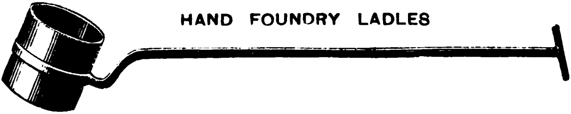
MALLEABLE LADLES

LEAD LADLES



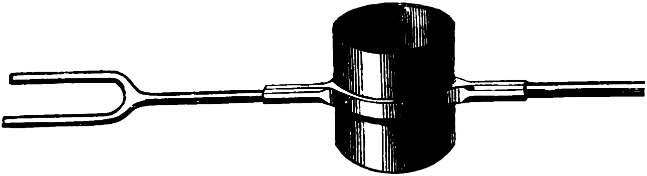
Size ... ... No.	25	26	27	28
To hold ... ... lbs.	4	7	14	28

HAND FOUNDRY LADLES



Size...	1	2	3	4
To carry ... lbs.	28	40	50	60

FOUNDRY LADLES

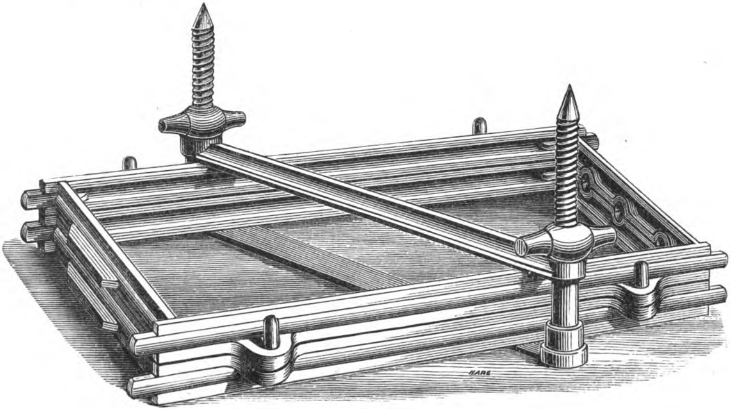


Size...	10	11	12	13	14
To carry... ... cwts.	1	1½	2	2½	3¼

The Lead Ladles are entirely of Malleable Iron.
The Hand and Foundry Ladles have Wrought-Iron Handles.

TANGYES'

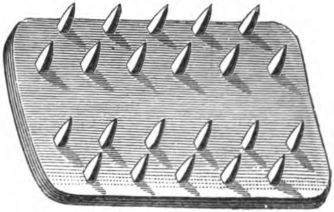
IMPROVED MALLEABLE ODD-SIDE MOULDING BOXES



The Special feature in these Improved Boxes is that they are so drilled and fitted that any one part will fit another of the same size :—

Size	Ins.	Ins.	Ins.	Ins.
2 parts	24×11×4	22×10×4	18×9×4	16×8×4
3 "	24×11×6	22×10×6	18×9×6	16×8×6

TANGYES' MALLEABLE BELT FASTENERS



SIZES

Ins. 1 1¼ 1½ 1¾ 2 2¼ 2½ 2¾ 3

TANGYES' MALLEABLE DOWEL PLATES

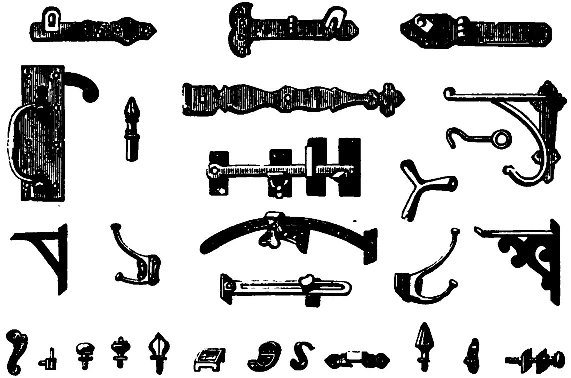
For pattern makers use.

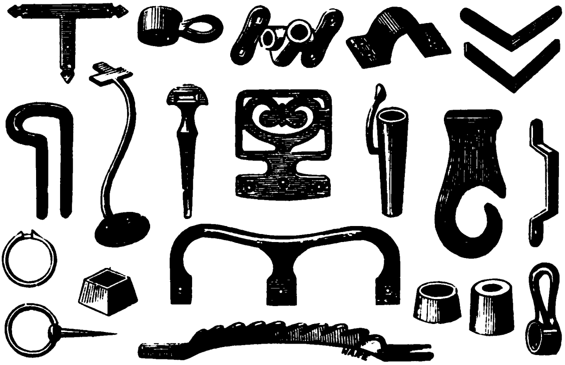
No.	1	2	3	4	5	6	7	8
Length, ins. ...	1	1¼	1 7/16	2	2⅛	3	3½	4
Width " ..	7/16	⅝	1	1⅜	1⅝	2⅛	2¾	3¼

Quotations on Application.

TANGYES'

MALLEABLE CASTINGS

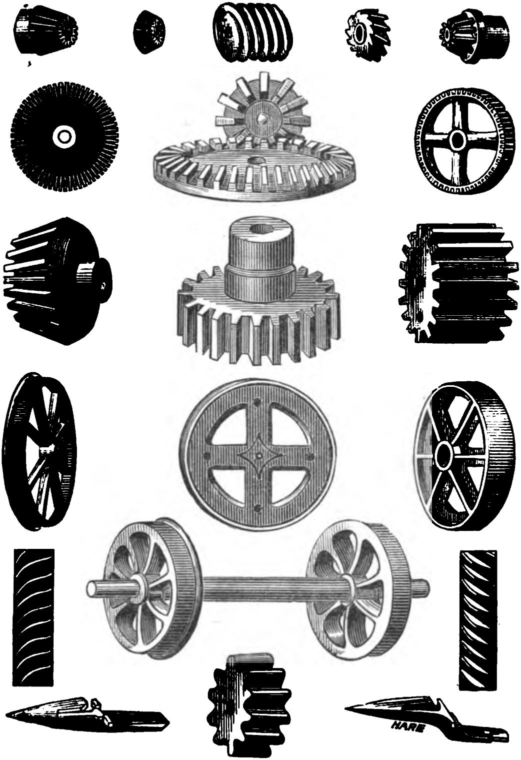




Quotations for these and other Malleable Castings on application.

TANGYES'

MALLEABLE CASTINGS

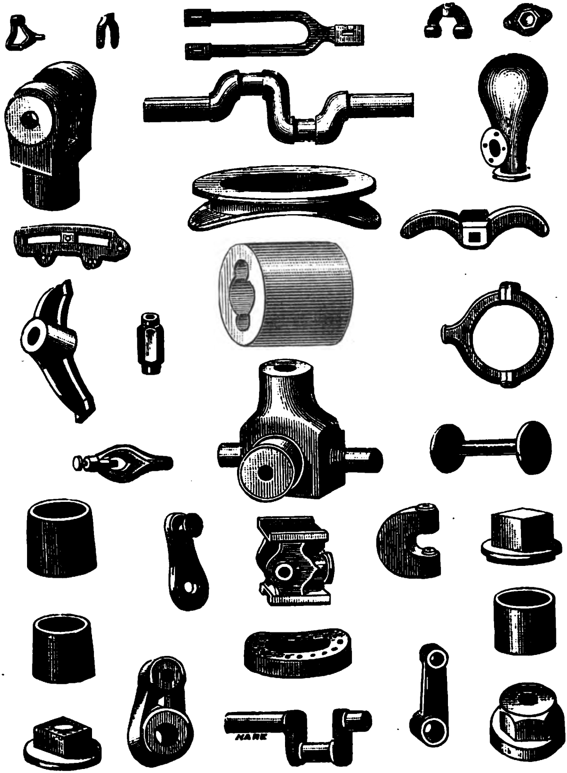


Quotations for these and other Malleable Castings on application.

TANGYES'

MALLEABLE CASTINGS

For Engineers.



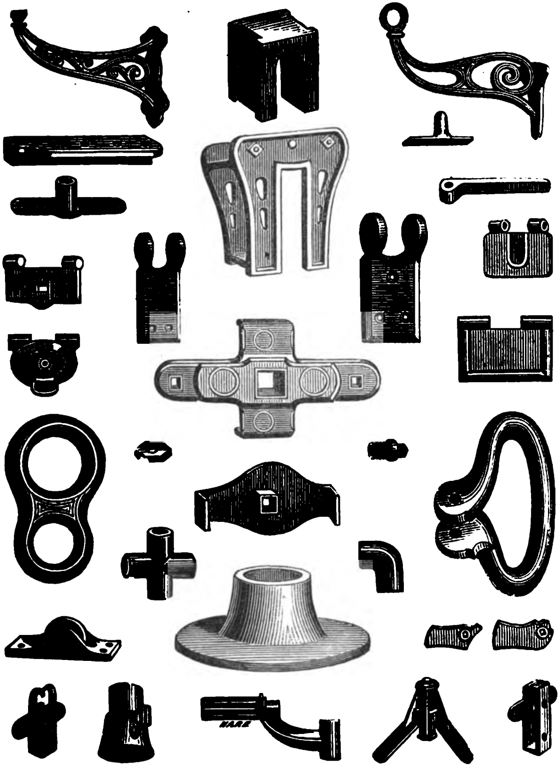
Quotations for these and other Malleable Castings on application.

Copyright—Entered Stationers' Hall.

TANGYES'

MALLEABLE CASTINGS

Railway Carriage, Wagon and Telegraph Fittings.

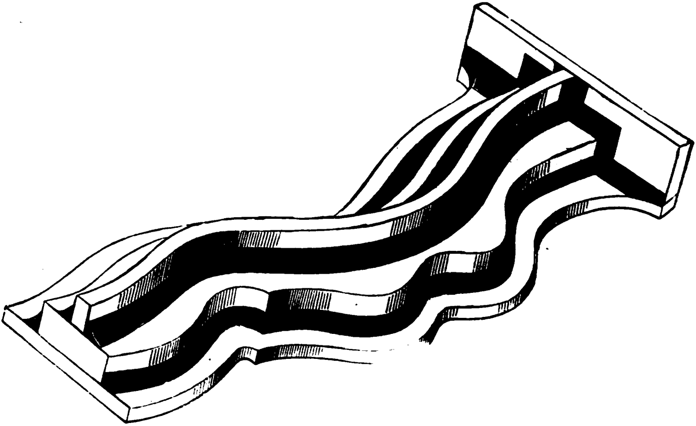


Quotations for these and other Malleable Castings on application.

TANGYES'

FOUNDRY PATTERN ANGLING

For facilitating the rounding of angles in patterns.

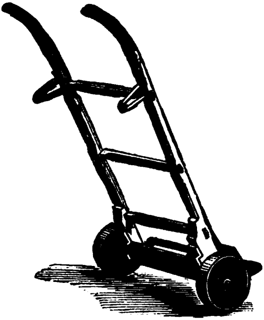


The engraving illustrates the application of the Angling by means of which three times as much straight work and ten times as much curved work can be turned out by the Pattern Maker as by working the angles out of the solid in the usual way.

To form an angle of the required radius, cover the angling with the adhesive cement, and place a strip in the corner of the work, pressing and rubbing it firmly in by means of a piece of wood having a rounded end.

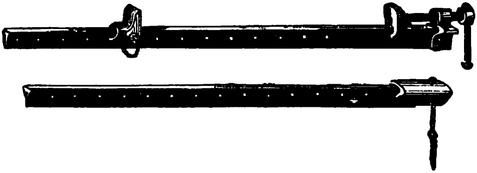
Width...	1¼ in.	⅜ in.	½ in.	⅝ in.	¾ in.
Strips per foot...	½d.	1¾d.	2d.	2¼d.	2½d.

WILMOTT'S PATENT HAND TRUCK



No.	1	2	3	4	5
Height ... ... ins.	45	50	54	56	64
With Locking Gear	**22/-**	**24/-**	**28/-**	**38/-**	**48/-**
Without " "	**18/-**	**19/-**	**22/-**	**31/-**	**37/-**

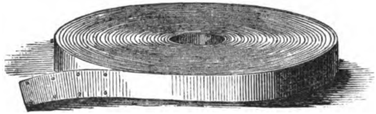
CARPENTER'S CRAMP



To take 36 inches	**14/-**
" 42 "	**16/-**
" 48 "	**18/-**
" 54 "	**19/-**
" 60 "	**21/-**
" 66 "	**23/-**
" 72 "	**25/-**

Lengthening Bars 2/6 per foot.
Brass Mounts 4/6 extra per Cramp.

LEATHER DRIVING BANDING



PRICE PER LINEAL FOOT.

Width ... ins.	2	2½	3	4	5	6	7	8	9	10	11	12
Single	9d.	1/-	1/4	1/10	2/5	2/9	3/4	4/-	4/7	5/2	5/8	6/6
Double	...	...	2/7	3/7	4/6	5/4	6/6	7/11	8/11	10/-	11/6	12/7

COTTON DRIVING BELTING

4 Ply	6 Ply	8 Ply	10 Ply
1½ in. 4½d. per ft.	3 in. 1/- per ft.	6 in. 2/6 per ft.	12 in. 6/- per ft.
1¾ " 5¼d. "	3½ " 1/2 "	7 " 2/11 "	15 " 7/6 "
2 " 6d. "	4 " 1/4 "	8 " 3/4 "	18 " 9/- "
2¼ " 6¾d. "	4½ " 1/6 "	9 " 3/9 "	24 " 12/- "
2½ " 7½d. "	5 " 1/8 "	10 " 4/2 "	30 " 15/- "
2¾ " 8¼d. "	6 " 2/- "	11 " 4/7 "	36 " 18/- "
3 " 9d. "	7 " 2/4 "	12 " 5/- "	40 " 20/- "
3½ " 10½d. "	8 " 2/8 "	15 " 6/3 "	44 " 22/- "
4 " 1/- "	9 " 3/- "	18 " 7/6 "	48 " 24/- "
5 " 1/3 "	10 " 3/4 "	24 " 10/- "	54 " 27/- "
6 " 1/6 "	12 " 4/- "	30 " 12/6 "	60 " 30/- "

Endless Belts, three feet extra.

BEST HELVETIA LACES

PER GROSS.

Length ... ft.	2	2½	3	3½	4	4½	5	5½	6
Width ... in.	¼	⅜	⅜	⅜	⅜	½	½	½	½
Price	15/8	27/4	31/3	39/-	46/10	54/8	62/5	70/3	78/-

DRIVING BAND SCREWS

¼	⅜	½	⅝	¾	⅞	1 inch
14/-	17/-	22/6	25/3	31/-	36/6	42/- per gross

Self-lubricating Steam Packing, 2/6 per lb.
Vulcanized Rubber Sheet Packing, 6/- per lb.

HOSE AND FITTINGS

BEST INDIA RUBBER WIRED SUCTION HOSE

PRICES PER FOOT.

Diam. ins.	½	⅝	¾	1	1¼	1½	1¾	2	2½	3	3½	4
2 ply ...	10d.	1/-	1/2	1/4½	1/8	1/10½	2/2	...	...	...	...	...
3 " ...	1/-	1/2	1/4	1/8	1/11	2/2	2/5	2/9	3/5	4/2	...	...
4 " ...	1/2	1/4	1/6	2/-	2/3	2/6	2/9	3/-	3/9	4/7	5/6	6/6
5 " ...	1/4	1/6	1/8	2/4	2/7	3/-	3/3	3/6	4/-	5/-	6/-	7/-

BEST INDIA RUBBER DELIVERY HOSE

PRICES PER FOOT.

Diam. ins.	½	⅝	¾	1	1¼	1½	1¾	2	2½	3	3½	4
2 ply ...	7¼d.	8½d.	9½d.	1/1½	1/4	1/6½	1/9	1/11½	2/5	2/10	3/3	3/8
3 " ...	8½d.	9½d.	11d.	1/3	1/6	1/9	2/-	2/3	2/8½	3/2	3/8	4/2
4 " ...	10d.	11d.	1/1½	1/5	1/8	1/11½	2/3	2/6	3/-	3/7	4/2	4/9
5 " ...	1/1	1/4	1/5	1/8	1/11	2/3½	2/6	2/9	3/4	4/-	4/8	5/4

BEST COPPER RIVETTED LEATHER HOSE

PRICES PER FOOT.

Diam. ... ... ins.	1	1½	2	2½	3	3½	4
Suction	...	3/3	3/9	4/3	5/3	5/9	6/6
Delivery	1/6	1/10	2/3	2/7	3/-	3/4	3/7

GUN-METAL HOSE UNIONS

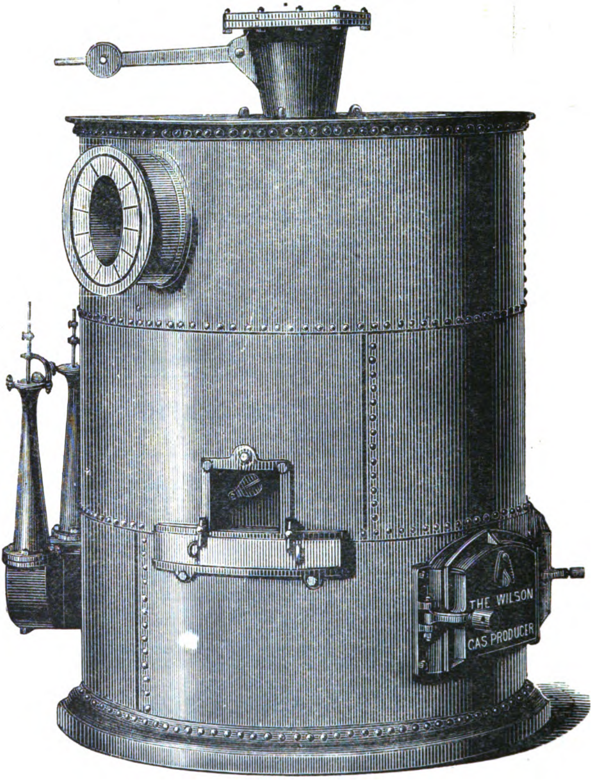
For Hose ... ins.	½	¾	⅞	1	1¼	1½	1¾	2	2¼	2½	3	3½	4
Each	2/3	2/9	3/9	4/6	5/6	7/-	8/6	10/-	12/-	15/-	18/-	24/-	32/6

COPPER BRANCH PIPES

For Hose ... ins.	1¼	1½	1¾	2	2½	3
Each	14/-	15/-	17/-	20/-	22/6	25/-

THE "WILSON" GAS PRODUCER

(Tangyes Limited, Manufacturers.)



For Firing Furnaces of every description.

THE "WILSON" GAS PRODUCER

(Tangyes Limited, Manufacturers)

This apparatus converts every portion of coal (except ash) into combustible Gas. There is no coke residue.

It is applicable to all classes of furnaces.

It will burn fine slack Coal, and utilise the same in the production even of a most intense heat with perfect facility.

It will burn cinders, coke, sawdust, breeze, and in fact any combustible matter containing even as much as 50°/o of ashes.

It works almost equally well with coking as with none-coking coal. A none-coking or slightly coking coal enables it to work with the least attention.

The ashes are drawn every 24 hours by two small doors at the bottom—the operation taking about 30 minutes—and during this time the production of gas is stopped. By using two Producers this stoppage is obviated.

To ascertain how many Gas Producers are required to fire a given number of furnaces it is only necessary to see what weight of fuel is at present burnt.

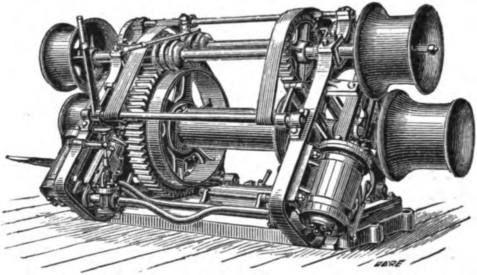
Size	To gasify
4 cwts.	4 cwts. slack per hour
8 ,,	8 ,, ,, ,,

THE NEW AUTOMATIC "WILSON" GAS PRODUCER

Is cleaned out continuously by simple mechanical means. The generation of Gas is thus made regular and constant, improving the quality and increasing the speed, besides effecting great saving in labour, and other advantages.

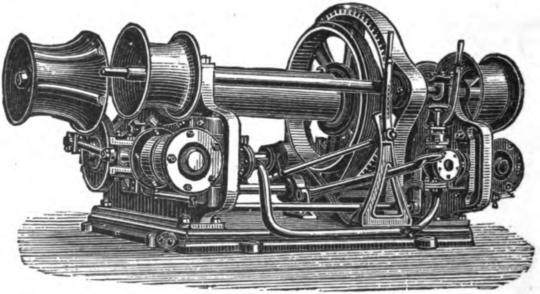
Prices on application.

IMPROVED DIAGONAL
SHIP'S STEAM WINCH



With Two	5	in. Cylinders,	10	in. Stroke,	to lift	2	Tons direct	£60
"	6	" "	10	" "	"	3	" "	70
"	7	" "	10	" "	"	4	" "	80
"	8	" "	12	" "	"	5	" "	90

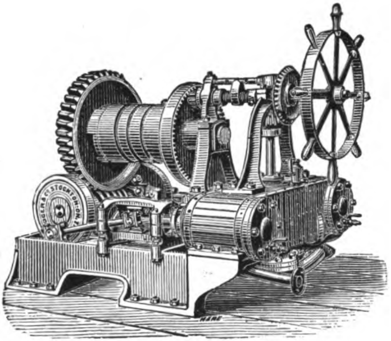
IMPROVED HORIZONTAL
SHIP'S STEAM WINCH



With Two	5	in. Cylinders,	10	in. Stroke,	to lift	2	Tons direct	£60
"	6	" "	10	" "	"	3	" "	70
"	7	" "	10	" "	"	4	" "	80
"	8	" "	12	" "	"	5	" "	90

STEAM STEERING GEAR

(Pepper's Patent.)



These Gears are fitted with a barrel, which will admit various sized chains or wire ropes (this cannot be done with a gipsy wheel.) There are no sliding clutches keyed on shaft. In the combined Gear the change from hand to steam or *vice versa* can be effected in a few seconds by *one* lever.

All automatic gear is dispensed with.

The steering wheel actuates one (the only) valve for distributing the steam, and is very easily worked.

The cylinders are self-draining, and kept well off the deck.

The engraving represents a Gear for working by steam only. The Combined Gear is similar in appearance.

Either the Steam or Combined Gear can be arranged to work by steam only, from upper bridge as well as from Wheel-house.

No.	Steam Cylinders	Stroke	Price Steam Gear	Price Combined Gear
2	Two 5 ins.	7 ins.	£105	£110
3	Two 6 "	8 "	115	120
4	Two 7 "	9 "	140	150

Upper Bridge Gear, with Cast-iron Column	£15 extra
Steering Wheel, for Steam Gears	£ 4 "
Steering Wheel, for Combined Gears £7, £7 10, and	£ 8 "
Brass Column, for Bridge (instead of Iron)	£ 5 "

WROUGHT-IRON TUBES AND FITTINGS

For Steam, Water, Gas, or Air

No	Internal Diam. ... ins.	¼		⅜		½		¾		1		1¼		1½		1¾		2		2¼		2½		2¾		3	
		s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1	Tubes, 2 to 14 ft. long, per ft.	0	2½	0	3	0	4¼	0	6	0	8½	0	11	1	2	1	6	1	9	2	6	3	3	4	0	4	6
2	Pieces, 12 to 23½ in. long, ea.	0	5	0	7	0	9	1	0	1	4	1	8	2	0	2	6	3	0	4	6	6	3	7	6	9	0
3	Do. 3 to 11½ "	0	3	0	4	0	6	0	8	0	11	1	1	1	4	2	0	2	3	4	0	4	9	6	0	7	0
4	Longscrews, 12 to 23½ "	0	7	0	9	0	11	1	2	1	6	2	0	2	6	3	3	4	0	5	6	7	0	8	6	10	0
5	Do. 3 to 11½ "	0	5	0	6	0	8	0	10	1	0	1	3	2	0	2	6	3	0	4	6	5	6	6	6	7	6
6	Bends ... ... "	0	6½	0	7	0	8	0	11	1	3	1	9	2	3	3	3	4	3	6	6	10	0	12	0	16	0
7, 8, 9	Springs, not socketed "	0	5	0	6	0	7	0	9	0	11	1	4	1	8	2	6	3	3	5	6	7	6	10	0	12	0
10, 11	Socket and Pipe Unions, ea.	2	0	2	6	3	0	4	0	5	6	6	9	8	0	9	0	10	0	12	0	14	0	16	0	18	0
12	Elbows, Wrought-iron ... "	0	6½	0	7	0	8	0	10	1	2	1	9	2	3	3	0	3	6	5	6	8	6	11	0	14	0
13	Tees ... ... "	0	6½	0	7	0	9	1	0	1	3	1	9	2	6	3	0	3	9	6	0	9	6	12	6	16	6
14	Crosses ... ... "	1	0	1	0	1	5	1	9	2	3	3	0	3	6	4	6	5	3	10	6	16	0	21	0	30	0
15	Plain Sockets ... ... "	0	1½	0	2	0	3	0	3½	0	4	0	6	0	7	0	9	1	0	1	6	2	6	3	0	3	6
16	Diminished Sockets ... "	0	3	0	4	0	5	0	6	0	7	0	9	0	11	1	1	1	3	2	0	3	0	4	0	5	0
17	Flanges ... ... "	0	9	0	10	1	0	1	2	1	4	1	6	1	9	2	0	2	6	3	9	5	0	6	9	8	6
18, 19	Caps and Plugs ... ... "	0	3	0	3	0	4	0	5	0	6	0	8	0	10	1	0	1	3	2	0	2	6	3	6	4	9
20, 21	Backnuts and Nipples ... "	0	2	0	2	0	3	0	3½	0	4	0	6	0	8	0	10	1	0	1	9	2	3	3	0	3	6
22	Union Bends ... ... "	2	6	3	0	3	9	5	0	6	3	8	6	10	0	11	6	13	6	16	0	19	0	22	0	25	0
23	Round Elbows ... ... "	0	7	0	8	0	9	1	0	1	4	1	11	2	6	3	4	3	10	6	6	10	0	13	0	16	0
24	Iron Main Cocks .. "	2	3	2	9	3	6	4	6	6	6	8	6	11	0	14	0	18	0	27	0	36	0	44	0	50	0
25	Do. with Brass Plugs "	...		4	6	5	6	7	6	10	6	15	0	19	6	25	0	32	0	47	0	60	0	90	0	110	0
26	Round Way Iron Cocks "	...		3	6	4	0	5	6	7	6	10	0	13	0	17	6	22	0	38	0	54	0	62	0	70	0
27	Do. with Brass Plugs "	...		5	0	6	6	9	0	13	0	19	0	28	0	36	0	42	0	60	0	85	0	105	0	120	0
28	Cock Spanners ... ... "	...		1	0	1	4	1	8	2	0	2	4	3	0	3	6	4	0	4	9	6	0	7	6	9	0

PATENT LAP-WELDED IRON BOILER TUBES, ENDS PLAIN

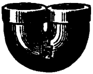
Ext. Diam. .. ins.	1½	1⅝	1¾	1⅞	2	2⅛	2¼	2½	2¾	3	3¼	3½	3¾	4	4¼	4½	4¾	5	5¼	5½	5¾	6
B. W. G.	14	13	13	13	12	12	12	11	11	11	10	10	10	9	9	9	8	8	8	7	7	7
Whitworth's Gauge 1000ths in.	85	95	95	95	110	110	110	120	120	120	135	135	135	150	150	150	165	165	165	180	180	180
Price per ft. ...	9½	9¾	10	10½	11	11½	1/-	1/1½	1/3	1/4½	1/8	1/9½	1/11	2/4	2/7	2/9	3/3	3/8	4/-	4/7	5/-	5/3

TANGYES'

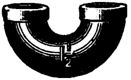
MALLEABLE IRON TUBE FITTINGS

For Steam Water, Gas and Air.

Nº 19


Nº 44a

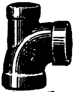
Nº 17


Nº 44

Nº 18

Nº 23

Nº 23a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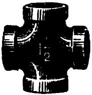
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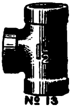
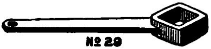

Nº 13

Nº 13a

Nº 16


Nº 29

Nº 20

These Fittings are, in most respects, very superior to the wrought-iron Fittings of the Tube Trade :—

In addition to being stronger and neater in appearance, they will stand a much greater internal pressure.

They are screwed to Whitworth's Standard Gas Pitch, and with more than ordinary accuracy. The Bends, Tees, Crosses, &c., have the screwing at true right angles.

Each Fitting has the size cast on it in bold figures.

No.	Internal Diam. } ins.	¼	⅜	½	¾	1	1¼	1½	1¾	2	2¼	2½	2¾	3
		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d	s. d.	s. d.	s. d.	s. d.	s. d.
13	Tees	0 6	0 7	0 9	1 0	1 3	1 9	2 6	3 0	3 9	6 0	9 6	12 6	16 6
13 A	" Reducing	0 7	0 7	0 9	1 0	1 3	1 9	2 6	3 0	3 9	6 0	9 6	12 6	16 6
14	Crosses ..	1 0	1 0	1 5	1 9	2 3	3 0	3 6	4 6	5 3	10 6	16 0	21 0	30 0
16	Sockts. Redcng.	0 3	0 4	0 5	0 6	0 7	0 9	0 11	1 1	1 3	2 0	3 0	4 0	5 0
17	Flanges ...	0 9	0 10	1 0	1 2	1 4	1 6	1 9	2 0	2 6	3 9	5 0	6 9	8 6
18	Caps	0 3	0 3	0 4	0 5	0 6	0 8	0 10	1 0	1 3	2 0	2 6	3 6	4 9
19	Plugs	0 3	0 3	0 4	0 5	0 6	0 8	0 10	1 0	1 3	2 0	2 6	3 6	4 9
20	Back Nuts ...	0 2	0 2	0 3	0 3	0 4	0 6	0 8	0 10	1 0	1 9	2 3	3 0	3 6
23	Elbows Round	0 7	0 7	0 8	0 10	1 2	1 9	2 3	3 0	3 6	5 6	9 0	12 0	15 0
23 A	" Reducing	0 7	0 7	0 8	0 10	1 2	1 9	2 3	3 0	3 6	5 6	9 0	12 0	15 0
23 B	" Drop ...	0 7	0 7	0 9	1 0	1 3	1 9	2 6	3 0	3 9	6 0	9 6	12 6	16 6
29	Cock Spanner	0 6	0 7	0 8	0 10	1 2	1 8	2 2	2 9	3 3	4 9	6 0	7 6	9 0
44	Return Bend...	1 0	1 0	1 3	1 6	2 0	3 0	3 6	5 0	6 6	9 6	15 6	21 0	26 0
44 A	" Close ...	0 10	0 10	1 0	1 3	1 9	2 6	3 3	4 6	5 6	7 6	13 6	18 0	22 0

For Galvanizing these Fittings, add 15 °/₀ to above List Prices.

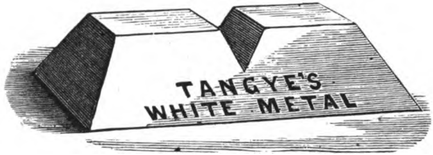
NOTE.—Whitworth's Gas and Steam Tube Threads are as follows :—

Size ... ins. ...	⅛	¼	⅜	½	¾	1	and upwards.
Threads per inch ...	28	19	19	14	14	11	

TANGYES'

ANTI-FRICTION WHITE METAL

For Bearings.



Tangyes' White Metal has proved to be an invaluable substitute for Brass or Gun-Metal in Bearings.

When used as bearings for shafting, neither fitting nor boring is required, if the instructions given below are carried out, consequently shafting can be much more quickly hung.

As a proof of its durability it may be mentioned that in many instances this Metal has been in use ten years without requiring renewal.

The Metal is supplied in Ingots of the form illustrated above, weighing about 14lbs. each, and can be re-cast and fitted in the same manner as Gun-Metal or Brass.

Instructions for Fixing Shafting:

Suspend the Shaft in its working position; stop the ends with putty, or with pieces of wood, so as to form a mould; then melt the metal in a ladle to about tin heat, and pour it in its place. When cool it will be ready for work.

PRICE ... 64/- PER CWT.

Special Quotations given for large quantities.

USEFUL MEMORANDA.

PROPERTIES OF CIRCLE

Circumference of Circle = diam. × 3·1416, or, × 3$\frac{1}{7}$th.
Diameter " = circumference × ·31831
Circumference " × ·2821 = side of square of equal area.
Diameter " × ·8862 = " "
Diameter " × ·7071 = side of inscribed square.
Diameter " = 1·128 $\sqrt{\text{area of circle}}$.
Area " = diam. squared × ·7854.
$\sqrt{\text{area}}$ " × 1·128 = diameter.
Sphere, cubic capacity of = diameter ^{3} × ·5236.

Mètre ... ... = 3·28 ft. = 39·371 ins.
Kilogramme ... ... = 2·2 lbs.
15 lbs. (or 1 atmosphere) pressure on square inch = 1·054 kilos. on sq. centimetre.

WATER, MEMORANDA CONNECTED WITH

1 cubic foot of water ... ... = 6·23 gallons.
1 " " ... ... = 62·4 lbs. = ·557 cwt. = ·028 tons.
1 gallon " ... ... = 10 lbs.
1 cwt. " ... ... = 1·8 cubic feet = 11·2 gallons.
1 ton " ... ... = 35·9 = 224 "
Pressure on sq. in. per foot head = ·433 = 43·3 lbs. per 100 feet.
1 lb. pressure ... ... = 2·31 feet.

$$\frac{\text{Gallons per hour} \times \text{height of lift}}{198{,}000}$$ = horse power—add 30% to 50% for friction

Area of section of iron × 10 = lbs. per yard wrought-iron.
Cubic inch of cast-iron ... = ·263 lbs.
Cubic foot " ... = 454 lbs.
Cubic foot of brickwork ... = 124 lbs.

Safe compressive load on cast-iron = 5 tons per sq. in.
" " " wrought-iron = 4 " "
Safe tensile " " = 5 " " } according to quality.
" " steel (best) = 10 " "

COMPARATIVE WEIGHTS OF DIFFERENT METALS

Bar Iron	1·000	Brass	1·090
Zinc	·909	Copper	1·162
Cast-iron	·932	Lead	1·474
Tin	·946	Gold	2·500
Steel	1·013		

SHORT-LINK IRON CHAIN

DIAMETER OF IRON		¼	5/16	⅜	7/16	½	9/16
BREAKING STRENGTH ...	tons				5·25	6·75	8·25
ULTIMATE STRAIN ...	"	1	1½	2	3·5	4·5	5·5
NAVY TEST	"		1⅛	1⅝	2¼	3	3¾
SAFE LOAD	"	½	¾	1	1½	2	2½
WEIGHT PER YARD ...	lbs.	2¼	3¼	4½	6	8	10

CONTINUED

DIAMETER OF IRON		⅝	11/16	¾	⅞	1	1¼	1½
BREAKING STRENGTH,	tons	10·5	12·75	15	20·5	27	42	60·75
ULTIMATE STRAIN ...	"	7	8½	10·42	13·75	18	28·12	40·5
NAVY TEST	"	4⅝	5⅝	6¾	9⅛	12	21	30
SAFE LOAD	"	3	4	5	6½	9	14	20
WEIGHT PER YARD	lbs.	12	15	18	24	30	45	60

WEIGHT OF CAST-IRON BALLS

From 1 to 12 ins. in lbs.

Inches	Lbs.	Inches	Lbs.	Inches	Lbs.
1	·14	4¾	14·76	8½	84·57
1⅛	·20	4⅞	15·95	8⅝	88·35
1¼	·27	5	17·21	8¾	92·25
1⅜	·36	5⅛	18·54	8⅞	96·26
1½	·47	5¼	19·93	9	100·39
1⅝	·59	5⅜	21·38	9⅛	104·63
1¾	·74	5½	22·91	9¼	108·99
1⅞	·91	5⅝	24·51	9⅜	113·47
2	1·10	5¾	26·18	9½	118·06
2⅛	1·32	5⅞	27·92	9⅝	122·77
2¼	1·57	6	29·74	9¾	127·63
2⅜	1·84	6⅛	31·64	9⅞	132·60
2½	2·15	6¼	33·62	10	137·70
2⅝	2·49	6⅜	35·68	10⅛	142·93
2¾	2·86	6½	37·81	10¼	148·29
2⅞	3·27	6⅝	40·04	10⅜	153·78
3	3·72	6¾	42·35	10½	159·40
3⅛	4·20	6⅞	44·75	10⅝	165·16
3¼	4·73	7	47·23	10¾	171·06
3⅜	5·29	7⅛	49·80	10⅞	177·10
3½	5·90	7¼	52·47	11	183·28
3⅝	6·56	7⅜	55·23	11⅛	189·60
3¾	7·26	7½	58·09	11¼	196·06
3⅞	8·01	7⅝	60·04	11⅜	202·67
4	8·81	7¾	64·09	11½	209·42
4⅛	9·67	7⅞	67·24	11⅝	216·33
4¼	10·57	8	70·50	11¾	223·38
4⅜	11·53	8⅛	73·86	11⅞	230·58
4½	12·55	8¼	77·32	12	237·94
4⅝	13·62	8⅜	80·89		

WEIGHT OF PLATE IRON

From ⅛ to 1 inch thick.

⅛	3/16	¼	5/16	⅜	7/16	½	9/16	⅝	11/16	¾	13/16	⅞	15/16	1 in.
5	7·5	10	12·5	15	17·5	20	22·5	25	27·5	30	32·5	35	37·5	40 lbs.

WEIGHT OF FLAT BAR IRON

12 inches long, in lbs.

Thickness	⅛	3/16	¼	⅜	½	⅝	¾	⅞	1 inch
Breadth in inches									
½	·21	·31	·42	·63					
¾	·32	·48	·63	·95	1·27	1·58			
1	·42	·63	·84	1·26	1·69	2·11	2·53	2·96	
1¼	·52	·79	1·05	1·58	2·11	2·64	3·16	3·70	4·22
1⅜	·58	·87	1·16	1·74	2·32	2·90	3·48	4·06	4·64
1½	·63	·95	1·27	1·90	2·53	3·17	3·80	4·44	5·07
1¾	·74	1·11	1·48	2·21	2·95	3·70	4·43	5·43	5·91
2	·84	1·27	1·69	2·53	3·38	4·22	5·07	5·92	6·76
2¼	·95	1·42	1·90	2·85	3·80	4·75	5·70	6·65	7·60
2½	1·06	1·58	2·11	3·17	4·22	5·28	6·33	7·40	8·45
2¾	1·16	1·74	2·32	3·49	4·64	5·81	6·97	8·13	9·29
3	1·27	1·90	2·53	3·80	5·07	6·34	7·60	8·87	10·14
3¼	1·37	2·06	2·74	4·12	5·49	6·86	8·24	10·09	10·98
3½	1·48	2·22	2·95	4·43	5·91	7·39	8·87	10·87	11·83
3¾	1·58	2·38	3·17	4·75	6·34	7·92	9·51	11·65	12·68
4	1·69	2·53	3·38	5·07	6·76	8·45	10·14	11·83	13·52
4½	1·90	2·85	3·80	5·70	7·60	9·50	11·41	13·31	15·21
5	2·11	3·17	4·22	6·34	8·45	10·56	12·67	14·79	16·90
6	2·53	3·80	5·07	7·60	10·14	12·67	15·21	17·75	20·28

WEIGHT OF WROUGHT-IRON BARS

12 ins. long, in lbs.

Inch	Round	Square	Inch	Round	Square
¼	·166	·211	2½	16·59	21·13
⅜	·373	·475	2⅝	18·30	23·29
½	·664	·845	2¾	20·08	25·56
⅝	1·04	1·32	2⅞	21·94	27·94
¾	1·50	1·90	3	23·96	30·42
⅞	2·03	2·59	3¼	28·04	35·70
1	2·65	3·38	3½	32·52	41·41
1⅛	3·36	4·28	3¾	37·34	47·53
1¼	4·15	5·28	4	42·48	54·08
1⅜	5·02	6·39	4¼	47·96	61·05
1½	5·99	7·60	4½	53·77	68·45
1⅝	7·01	8·92	4¾	59·91	76·27
1¾	8·13	10·35	5	66·38	84·51
1⅞	9·33	11·88	5¼	73·18	93·17
2	10·62	13·52	5½	80·32	102·25
2⅛	11·99	15·26	5¾	87·78	111·76
2¼	13·44	17·11	6	95·58	121·69
2⅜	14·98	19·07	7	130·10	165·63

WEIGHT OF SOLID CYLINDERS OF CAST-IRON

12 ins. long, in lbs.

Diam. Inch.	Weight in lbs.	Diam. Inch.	Weight in lbs.	Diam. Inch.	Weight in lbs.	Diam. Inch.	Weight in lbs.	Diam. Inch.	Weight in lbs.
¾	1·394	2⅛	11·193	3½	30·364	5¾	81·953	9	200·776
⅞	1·898	2¼	12·548	3⅝	32·572	6	89·234	9½	223·705
1	2·479	2⅜	13·981	3¾	34·857	6¼	96·825	10	247·872
1⅛	3·137	2½	15·492	3⅞	37·219	6½	104·726	10½	273·279
1¼	3·873	2⅝	17·080	4	39·660	6¾	112·936	11	299·925
1⅜	4·686	2¾	18·745	4¼	44·772	7	121·457	11½	327·811
1½	5·577	2⅞	20·488	4½	50·194	7¼	130·288	12	356·935
1⅝	6·545	3	22·308	4¾	55·926	7½	139·428	13	418·903
1¾	7·591	3⅛	24·206	5	61·968	7¾	148·878	14	485·829
1⅞	8 714	3¼	26·181	5¼	68·320	8	158 638	15	557·712
2	9·915	3⅜	28·234	5½	74·981	8½	179·087	16	634·552

PRESSURES OF COLUMNS OF WATER

Diam. Ram in Inches	PRESSURE PER SQUARE INCH IN CWTS.										
	10	15	20	25	30	35	40	45	50	55	60
	TOTAL PRESSURE ON RAM IN TONS										
½	·098	·147	·195	·245	·29	·34	·39	·44	·49	·535	·585
⅝	·153	·23	·305	·383	455	·535	·61	·69	·765	·84	·92
¾	·22	·331	·44	·552	·66	·77	·88	·99	1·1	1·21	1·32
⅞	·30	·45	·60	·75	·90	1·05	1·2	1·35	1·5	1·65	1·8
1	·392	·589	·785	·98	1·175	1·37	1·57	1·765	1·96	2·155	2·355
1½	·883	1·325	1·765	2·205	2·65	3·09	3·53	3·975	4·415	4·855	5·3
2	1·57	2·355	3·14	3·925	4·71	5·495	6·28	7·065	7·85	8·635	9·42
3	3·84	5·3	7·06	8·83	10·6	12·36	14·13	15·9	17·67	19·43	21·2
4	6·28	9·4	12·56	15·7	18·84	21·98	25·13	28·27	31·41	34·55	37·69
5	9·81	14·7	19·63	24·53	29·45	34·35	39·27	44·17	49·08	53·99	58·90
6	14·13	21·2	28·27	35·33	42·41	49·47	56·54	63·61	70 68	77·75	84·82
7	19·24	28·85	38·48	48·1	57·72	67·34	76·96	86·58	96·21	105·83	115·45
8	25·13	37·67	50·26	62·82	75·39	87·96	100·53	113·09	125·66	138·22	150·79
9	31·80	47·7	63·61	79·51	95·42	111·32	127.23	143·13	159·04	174·94	190·85
10	39·26	58·9	78·53	98·67	117·80	137·43	157·07	176·71	196·34	215·97	235·61
11	47·51	71·25	95·03	118·78	142·54	166·3	190·06	213·87	237·58	261·33	285·09
12	56·54	84·7	113·09	141·36	169·64	197·91	226·69	254·46	282·74	311·01	339·29
13	66·36	99·52	132·73	165·91	199·09	232·27	265·46	298·64	331·83	365·01	398·19
14	76·96	115·42	153·98	192·41	230·90	269·38	307·87	346·35	384·84	423·32	461·81
15	88·35	132·52	176·71	220·88	265·07	309·24	353·42	397·6	441·78	485·96	530·14
16	100·53	150·75	201·06	251·32	301·59	351·85	402·12	452·38	502·65	552·96	603·68
17	113·49	170·17	226·98	288·72	340·47	397·21	453·96	510·70	567·45	624·19	680·92
18	127·23	190·8	254·46	318·07	381·7	445·31	508·92	572·53	636·17	699·78	763·40
19	141·76	212·62	283·52	354·4	425·29	496·17	567·05	637·93	708·82	779·7	850·58
20	157·07	235·57	314·15	392·68	471·23	549·77	628·31	706·85	785·39	863·93	942·47
21	173·18	259·72	346·36	432·95	519·54	606·13	692·72	779·31	865·9	952·49	1039·08
22	190·06	285·07	380·13	475·16	570·19	665·22	760·26	855·29	950·33	1045·36	1140·39
23	207·73	311·55	415·47	519·33	623·21	727·07	830·94	934·8	1038·68	1142·55	1246·42
24	226·19	339·22	452·38	565·47	678·58	791·67	904·77	1017·87	1130·97	1244·06	1357·16

PRESSURES OF COLUMNS OF WATER

Diam. Ram in Inches	PRESSURE IN LBS. PER SQUARE INCH													
	25	30	35	40	45	50	100	200	300	400	500	600	700	1000
	TOTAL PRESSURE ON RAM IN LBS.													
½	4·90	5·88	6·87	7·85	8·83	9·81	19·63	39·26	58·89	78·52	98·15	117·78	137·41	196·30
⅝	7·67	9·20	10·73	12·27	13·80	15·34	30·68	61·36	92·04	122·72	153·40	184·08	214·76	306·80
¾	11·04	13·25	15·45	17·66	19·87	22·08	44·17	88·34	132·51	176·68	220·90	265·02	309·19	441·80
⅞	15·03	18·03	21·04	24·05	27·05	30·06	60·13	120·26	180·39	240·52	300·65	360·78	420·91	601·30
1	19·63	23·56	27·48	31·41	35·34	39·27	78·54	157·08	235·62	314·16	392·70	471·24	549·78	785·40
1½	44·17	53·01	61·84	70·68	79·51	88·35	176·71	353·42	530·13	706·84	883·55	1060·26	1236·97	1767·10
2	78·50	94·20	109·9	125·6	141·3	157·0	314·10	628·20	942·30	1256·40	1570·50	1884·60	2198·70	3141·60
	TOTAL PRESSURE ON RAM IN TONS													
3	·078	·094	·110	·125	·141	·158	·315	·930	·945	1·260	1·575	1·891	2·206	3·151
4	·140	·167	·195	·223	·250	·279	·560	1·121	1·682	2·242	2·803	3·364	3·925	5·609
5	·218	·262	·306	·350	·393	·437	·876	1·752	2·629	3·505	4·381	5·258	6·134	8·765
6	·315	·378	·441	·504	·567	·630	1·262	2·524	3·708	5·048	6·310	7·572	8·834	12·622
7	·429	·515	·600	·711	·773	·858	1·717	3·435	5·153	6·871	8·589	10·307	12·025	17·180
8	·560	·762	·785	·897	1·009	1·123	2·243	4·487	6·731	8·975	11·218	13·462	15·706	22·439
9	·709	·851	·993	1·135	1·277	1·419	2·839	5·679	8·519	11·358	14·198	17·038	19·878	28·400
10	·876	1·051	1·226	1·402	1·578	1·753	3·506	7·012	10·514	14·022	17·531	21·037	24·543	35·062
11	1·060	1·272	1·484	1·696	1·908	2·120	4·242	8·484	12·727	16·968	21·212	25·450	29·696	42·425
12	1·261	1·513	1·765	2·017	2·270	2·522	5·048	10·097	15·145	20·194	25·243	30·291	35·340	50·489
13	1.480	1·777	2·073	2·369	2·666	2·962	5·925	11·850	17·776	23·701	29·627	35·552	41·478	59·255
14	1·717	2·061	2·404	2·748	3·091	3·435	6·871	13·743	20·615	27·487	34·359	41·231	48·103	68·722
15	1·971	2·366	2·760	3·155	3·550	3·944	7·888	15·777	23·665	31·555	39·441	47·333	55·221	78·890
16	2·243	2·691	3·140	3·589	4·037	4·486	8·975	17·951	26·927	35·903	44·879	53·855	62·741	89·759
17	2·532	3·038	3·545	4·051	4·558	5·064	10·133	20·266	30·399	40·532	50·665	60·798	70·931	101·330
18	2·839	3·407	3.975	4·542	5·110	5·678	11·359	22·719	34·079	45·439	56·799	68·158	79·518	113·598
19	3·163	3·796	4·429	5·062	5·695	6·323	12·675	25·314	37·971	50·628	63·285	75·942	88·600	126·575
20	3·505	4·206	4·907	5·608	6·328	7·011	14·025	28·050	42·075	56·100	70·125	84·150	98·175	140·249
21	3·864	4·682	5·419	6·183	6·957	7.729	15·462	30·929	46·387	61·850	77·312	92·775	108·237	154·625
22	4·241	5·090	5·938	6·787	7·636	8·484	16·970	33·940	50·910	67·880	84·850	101·820	118·790	169·700
23	4·636	5·563	6·490	7·417	8·345	9·276	18·547	37·095	55·643	74·191	92·738	111·286	129·834	185·479
24	5·047	6·057	7·066	8·076	9·086	10·095	20·195	40·391	60·586	80·782	100·977	121·173	141·368	201·959

DIAMETERS, CIRCUMFERENCES, AND AREAS

Diam.	Circum.	Area	Diam.	Circum.	Area
⅛	·3927	·0122	6¼	19·635	30·679
¼	·7854	·0490	½	20·420	33·183
⅜	1·1781	·1104	¾	21·205	35·784
½	1·5708	·1963	7 in.	21·991	38·484
⅝	1·9635	·3068	¼	22·776	41·282
¾	2·3562	·4417	½	23·562	44·178
⅞	2·7489	·6013	¾	24·347	47·173
1 in.	3·1416	·7854	8 in.	25·132	50·265
⅛	3·5343	·9940	¼	25·918	53·456
¼	3·9270	1·2271	½	26·703	56·745
⅜	4·3197	1·4848	¾	27·489	60·132
½	4·7124	1·7671	9 in.	28·274	63·617
⅝	5·1051	2·0739	¼	29·059	67·200
¾	5·4978	2·4052	½	29·845	70·882
⅞	5·8905	2·7611	¾	30·630	74·662
2 in.	6·2832	3·1416	10 in.	31·415	78·540
⅛	6·6759	3·5465	¼	32·201	82·516
¼	7·0686	3·9760	½	32·986	86·590
⅜	7·4613	4·4302	¾	33·772	90·762
½	7·8540	4.9087	11 in.	34·557	95·033
⅝	8·2467	5·4119	¼	35·342	99·402
¾	8·6394	5·9395	½	36·128	103·86
⅞	9·0321	6·4918	¾	36·913	108·43
3 in.	9·4248	7·0686	12 in.	37·699	113·09
⅛	9·8175	7·6699	½	39·269	122·71
¼	10·210	8·2957	13 in.	40·840	132·73
⅜	10·602	8·9462	½	42·411	143·13
½	10·995	9·6211	14 in.	43·982	153·93
⅝	11·388	10·320	½	45·553	165·13
¾	11·781	11·044	15 in.	47·123	176·71
⅞	12·173	11·793	½	48·694	188·69
4 in.	12·566	12·566	16 in.	50·265	201·06
⅛	12·959	13·364	½	51·836	213·82
¼	13·351	14·186	17 in.	53·407	226·98
⅜	13·744	15·033	½	54·977	240·52
½	14·137	15·904	18 in.	56·548	254·46
⅝	14·529	16·800	½	58·119	268·80
¾	14·922	17·720	19 in.	59·690	283·52
⅞	15·315	18·665	½	61·261	298·64
5 in.	15·708	19·635	20 in.	62·831	314·16
⅛	16·100	20·629	½	64·402	330·06
¼	16·493	21·647	21 in.	65·973	346·36
⅜	16·886	22·690	½	67·544	363·05
½	17·278	23·758	22 in.	69·115	380·13
⅝	17·671	24·850	½	70·685	397·60
¾	18·064	25·967	23 in.	72·256	415·47
⅞	18·456	26·108	½	73·827	433·73
6 in.	18·849	28·274	24 in.	75·398	452·39

DIAMETERS, CIRCUMFERENCES, AND AREAS

Diam.	Circum.	Area	Diam.	Circum.	Area
24½	76·969	471·43	48½	152·36	1847.4
25 in.	78·539	490·87	49 in.	153·93	1885·7
½	80·110	510·70	½	155·50	1924·4
26 in.	81·681	530·93	50 in.	157·07	1963·4
½	83·252	551·54	½	158·65	2002·9
27 in.	84·823	572·55	51 in.	160·22	2042·8
½	86·393	593·95	½	161·79	2083·0
28 in.	87·964	615·75	52 in.	163·36	2123·7
½	89·534	637·94	½	164·93	2164·7
29 in.	91·106	660·52	53 in.	166·50	2206·1
½	92·677	683·49	½	168·07	2248·0
30 in.	94·247	706·86	54 in.	169·64	2290·2
½	95·818	730·61	½	171·21	2332·8
31 in.	97·389	754·76	55 in.	172·78	2375·8
½	98·960	779·31	½	174·35	2419·2
32 in.	100·53	804·24	56 in.	175·92	2463·0
½	102·10	829·57	½	177·50	2507·1
33 in.	103·67	855·30	57 in.	179·07	2551·7
½	105·24	881·41	½	180·64	2596·7
34 in.	106·81	907·92	58 in.	182·21	2642·0
½	108·38	934·82	½	183·78	2687·8
35 in.	109·95	962·11	59 in.	185·35	2733·9
½	111·52	989·80	½	186·92	2780·5
36 in.	113·09	1017·8	60 in.	188·49	2827·4
½	114·66	1046·3	½	190·06	2874·7
37 in.	116·23	1075·2	61 in.	191·63	2922·4
½	117·80	1104·4	½	193·20	2970·5
38 in.	119·38	1134·1	62 in.	194·77	3019·0
½	120·95	1164·1	½	196·34	3067·9
39 in.	122·52	1194·5	63 in.	197·92	3117·2
½	124·09	1225·4	½	199·49	3166·9
40 in.	125·66	1256·6	64 in.	201·06	3216·9
½	127·23	1288·2	½	202·63	3267·4
41 in.	128·80	1320·2	65 in.	204·20	3318·3
½	130·37	1352·6	½	205·77	3369·5
42 in.	131·94	1385·4	66 in.	207·34	3421·1
½	133·51	1418·6	½	208·91	3473·2
43 in.	135·08	1452·2	67 in.	210·48	3525·6
½	136·65	1486·1	½	212·05	3578·4
44 in.	138·23	1520·5	68 in.	213·62	3631·6
½	139·80	1555·2	½	215·19	3685·2
45 in.	141·37	1590·4	69 in.	216·76	3739·2
½	142·94	1625·9	½	218·34	3793·6
46 in.	144·51	1661·9	70 in.	219·91	3848·4
½	146·08	1698·2	½	221·48	3903·6
47 in.	147·65	1734·9	71 in.	223·05	3959·1
½	149·22	1772·0	½	224·62	4015·1
48 in.	150·79	1809·5	72 in.	226·19	4071·5

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